The AUTOMOBILE

June 12 1913

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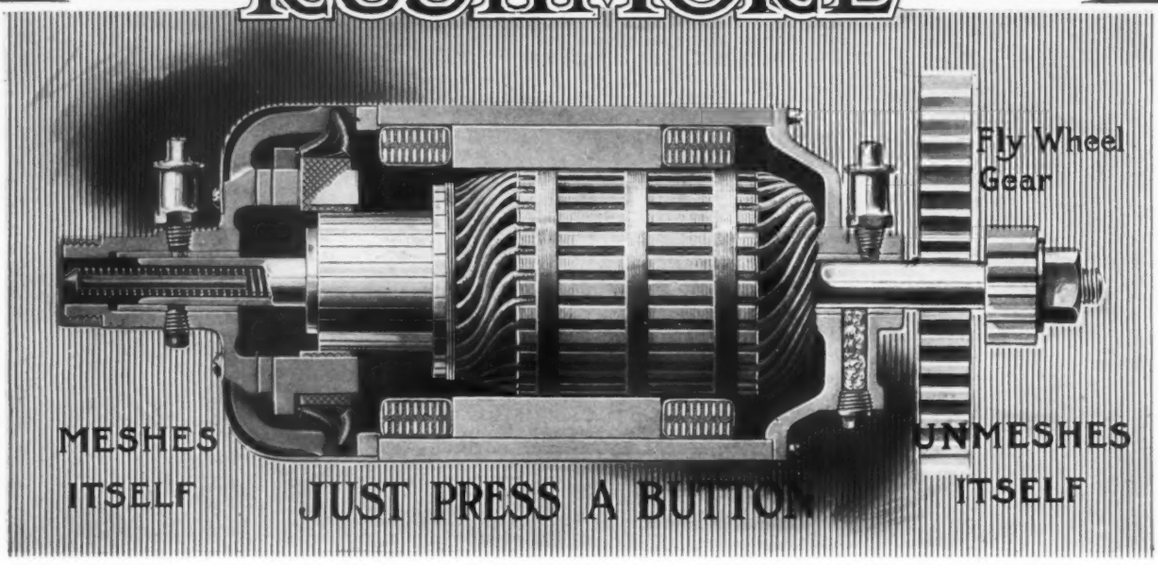

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Did you ever hear of a starter so totally free from tendency to wear itself out that not even the commutator needed attention?

Probably not; yet that very thing is true of the Rushmore Starter!

If you have the Rushmore System on your car there is literally **nothing** to do to keep it in order except to squirt a few drops of oil into the oil cups once a week.

Like the other sensational Rushmore features, this one has a good reason behind it. The motor is purposely so arranged that a little of the oil from the bearing finds its way to the commutator and lubricates the brushes. The latter are copper, and consequently of negligible resistance. As the Starter runs only when starting, both the wear and the demand for lubricant are at the lowest minimum. Our tests have shown that in thousands of miles the commutator needs absolutely no attention and can simply be forgotten by the user.

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These things did not happen by chance. The Rushmore Starting and Lighting System is the product of a scientific investigation into the entire subject of automobile starting and lighting, and was developed after all other systems had been analyzed and rejected for inherent faults. The Starter operates, and the Dynamo governs itself, without any of the mechanism commonly thought necessary, yet both are completely automatic.

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LONDON PARIS BERLIN

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The AUTOMOBILE

Engineers Close Session

Lake Trip Even Greater Success Than Last Year—Big Program Carried Out—English and Americans Unite in Work and Play

By J. Edward Schipper

DETROIT, MICH., June 7—Today marked the close of the summer session of the Society of Automobile Engineers and Institution of Automobile Engineers of England held on board the steamship *City of Detroit III* while cruising on Lake Huron to the Soo, Mackinac Island and back. Combining business and pleasure the second annual cruise was an immense success both socially and in an engineering way. The long program was almost entirely carried out, the exceptions being the omission of some of the topics for discussion and two papers which were not read owing to the absence of their authors.

The attendance was excellent, 569 passengers being carried, of whom 50 per cent. were engineers and the remainder associates and members of their respective families. At the sessions in the main saloon held in the morning and afternoon of Thursday and the mornings of Friday and Saturday attendance averaged 200.

Among those in the party were the chief engineers of a score of the leading automobile manufacturers, engineers of many of the leading parts manufacturers, and engineering representatives of metallurgical concerns engaged in steel and iron manufacture. A percentage of the party was made up of the selling representatives of concerns holding affiliate memberships. Among the party were Past-Presidents Howard Coffin, Henry Souther and Thomas J. Fay.

Let their varying efforts unite for the best interests of motoring in both nations

Every opportunity was afforded for mixing business with pleasure during the 4 days on the boat. On Thursday there was a 4-hour stop at the Soo, when the American locks were inspected. On Friday 6 hours were spent on Mackinac Island, this being ample time for driving and walking parties to explore the entire island. Naturally nearly all of the party took advantage of the opportunity.

Important developments took place at the meetings, the work done by the various divisions of the standards committee was watched with great interest by both the members of the S. A. E. and I. A. E. Ten divisions were called upon for committee reports. Out of these there were three submitted reports which were accepted, one, that on iron and steel with an amendment. The other two accepted were of the nomenclature and miscellaneous divisions. All the other committees reported progress and many important ones promised reports for the winter session. Among the latter are the ball and roller bearing, commercial car wheel and sub-committees of the electrical divisions. The committee reports will be found on page 1220.

President Marmon opened the meeting Thursday morning with a short speech of welcome to the British guests and members, stating that the greatest and most important works of the society are its efforts along the lines of

One-quarter of a panorama view of the majority of the members of the S. A. E.—I. A. E. party at Mackinac Island

standardization begun some years ago. The society has made immense progress in this and has succeeded in creating standards that have been accepted throughout the entire automobile industry.

President Marmon also dwelt to a large extent on the value of the section meetings. "It is these section meetings," stated he, "that hold the entire society together in a way that would be impossible were we to have only the semi-annual sessions."

I. A. E Honors Marmon

T. B. Browne, president of the Institution of Automobile Engineers of the British Isles, expressed the thanks of the British guests to their host, the S. A. E., and as an expression of gratitude, President Marmon was presented with an honorary membership in the I. A. E. This is a signal honor, as Mr. Marmon is the first and only honorary member of the I. A. E. To Coker Clarkson, secretary of the S. A. E., on behalf of the Britishers, who appreciated his tireless efforts in their behalf was presented with a silver card tray. Alden L. McMurtry, head of the transportation department of the S. A. E., was presented with a silver plate as a token of the visitors' appreciation of his work for them.

City of Detroit III, which was the home of the party for parts of 4 days on Lake Huron. There were 569 in all

The reports showed that the society is not falling off from its rapid growth. It now numbers 1,635 members. Since January the following elections have taken place: New members, 72; associates, 91; Juniors, 7; a total of 170.

Besides these four affiliates were elected.

The treasurer's report showed a balance of $6,557.84 in the treasury. Since the last meeting held in New York in January the total receipts and disbursements of the society have been:

Receipts	$25,637.30
Disbursements	19,079.46
Balance	$6,557.84

An important feature of the session was a resolution of the society against the Oldfield patent bill now pending before Congress. This bill menaces the rights of holders of patents and, in fact, does much to rob the inventor of the fruits of his invention. Milton Tibbetts, head of the Packard patent department, read a paper he had prepared and read the resolution. In this he cited the fact that the progress of the age and the advance in civilization are due to the work of inventors. The society unanimously adopted his resolution, which was "that the president of the S. A. E. appoint a committee on patent investigation on behalf of the inventors and that the progress of its investigations be reported to the society." The committee consists of Messrs. Milton Tibbetts, Herman Cuntz and Howard Coffin.

The committee went quickly and vigorously to work and at the final session furnished its report, which included the following

Resolution:

Resolved: First; that the Society of Automobile Engineers is opposed to the Oldfield bill; second, that it is opposed to any fundmaental changes in the patent law without thorough investigation and fair public hearings; and third, that a copy of this resolution be forwarded, on behalf of the society, to every Senator and Representative and to other engineering societies.

In the professional program the Britishers played an important part, presenting four of the papers read and participating generally in all discussions. President Browne, of the I. A. E., told

Third quarter of the panorama, showing how many of the men came out in comic costume

Second quarter of the panorama of the party, which formed into a circle with the camera in the center

of the growth, development and construction of gasoline omnibuses in London; Thomas Clarkson, the leader in the manufacture of steam buses in London, delineated their advantages and present-day status; Charles Wheeler, head of the motor transport department of the British post office, spoke on calculating efficiency; and E. B. Wood, Bristol, on the measurement of horsepower.

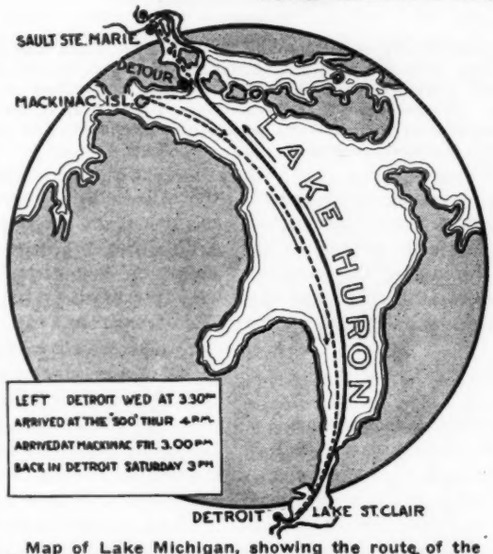
In the program presented by the American engineers twelve pertinent subjects were considered: Paul W. Litchfield, factory manager of the Goodyear company, gave an exhaustive treatise on the pneumatic tire situation of today, his paper being sufficiently elementary to be followed by a layman, yet most up-to-date.

Houk on Wire Wheels

George W. Houk, representative of the Rudge-Whitworth wire wheel interests in America, read a comprehensive paper on wire wheels, drawing attention to their light weight and enumerating their various advantages and disadvantages for passenger car use.

From an engineering viewpoint Enrique Toucedal's paper on malleable iron was of leading interest, in that this metal is coming into more general use in motor car construction and, although more or less ridiculed by engineers to date, it is now arousing great attention, due to improvements in methods of handling it.

The interest of users and makers of commercial motor vehicles were well looked over, an entire day being given over to the reading of papers on relevant subjects and the discussions on same. The entire program follows:



Map of Lake Michigan, showing the route of the S. A. E.-I. A. E. excursion from Detroit to the Soo, to Mackinac Island and back to Detroit

A New Tensile Test-Piece and Holder.—By K. W. Zimmerschied.
Pneumatic Tires.—By Paul W. Litchfield.
Lubricating Oil.—By Harry Tipper.
Manufacture and Physical Properties of Malleable Iron.—By Enrique Toucedal.
Petrol Buses.—By T. B. Browne, President, Institution of Automobile Engineers.
Steam Buses.—By Thomas Clarkson, Member of Society of Motor Manufacturers and Traders.
Calculating Depreciation of Commercial Automobiles.—By Charles Wheeler, Member Institution of Automobile Engineers.
Jackshaft versus Double Rear-Wheel Brakes. By Arthur M. Laycock.
Metal Wheels.—By Arthur J. Slade.
Automobile Production Inspection Methods.—By E. F. Roberts.
Influence of the Sales Department on the Design of Motor Cars.—By F. E. Moskovics.
Wire Wheels.—By George W. Houk.
Motor Construction.—By Claude E. Cox.
The Measurement of Horsepower.—By Prof. W. Morgan, B. Sc. and E. B. Wood, M. A.
Notes on Power Variations with Atmospheric Changes.—By Herbert Chase.
A Consideration of Certain Problems of Carburetion.—By Arthur B. Browne.

Cruise a Delight

The route taken by the boat on its 4-day cruise was a real delight. Steaming up the Detroit River into Lake St. Clair, the shores of Ontario and Michigan are one-half mile distant. The river widens into the lake, the shore on the Canadian side receding until it is no longer visible. At the north end of the lake, a 40-minute sail, the waters again narrow and the boat passes into the St. Clair River and, 30 miles farther on, enters Lake Huron. The course lies lengthwise of the lake, far out of sight of land, to Sault Ste. Marie, familiarly designated the Soo. From the Soo, the return trip was started via Mackinac Island and thence to Detroit.

The steamer left the dock at 4 p. m., Wednesday. The weather was all that could be desired and a large crowd accompanied the members of the party to the pier. As the boat cast off and

The fourth quarter of the panorama shows how many ladies accompanied the party on board the City of Detroit III

started up the Detroit River, the members of the party who had tramped many miles through the mazes of the Continental, Hudson and Chalmers plants that morning were glad to seat themselves on deck and take a much-needed rest in the quiet enjoyment of the sail up the river.

After dinner the evening was spent in various ways throughout the different parts of the boat. A dance was in progress on the main deck, while others joined in the songs on the saloon deck.

The boat landed at the Soo at 4 p. m. Thursday. The landing of the boat was the signal for the rapid conversion of a large gathering of dignified engineers into a yelling tribe of Indians. The natives lined the streets of the sober little town, while the engineers marched through them in impossible attire consisting of various disjointed sections of feminine clothing and with their heads protected from the invisible sun by large Japanese parasols of various gaudy colors.

Officers Society of Automobile Engineers on board City of Detroit III. Top row, left to right—Coker F. Clarkson, secretary; Henry Souther, past-president; Arthur B. Cumner, committee on arrangements. Second row—C. B. Whittelsey, council; J. G. Perrin, first vice-president; Russel Huff, second vice-president, and lower left, Howard Marmon, president

Only two hours were allowed at this port, but by the end of that time every visitor to the town felt perfectly at home. The little German band which had been hired for the occasion marched proudly through the main streets at the head of the noisy procession, while the rear was brought up by an enthusiastic mob of small boys.

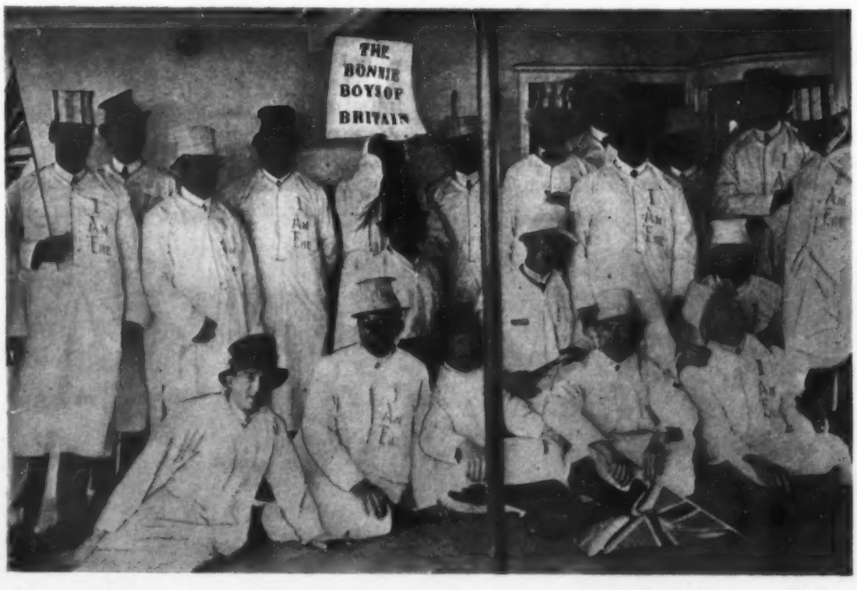
Some Visit the Locks

A goodly portion of the more sober-minded members took a walk up to the fresh-water locks, for which this place is noted, and watched the heavy freighters go through.

The embarkation of the shore party at 6 p. m. would have broadened the smile of the Sphinx. The ill-assorted chorus of improvised musical instruments, mingled with the hoots of the small boys in one inharmonious squeal, would have shamed the best efforts of the imps of Dante's inferno.

The features of the entertainment of the evening on board were the Gridiron meeting of the Bonnie Boys of Britain and the camp-fire trial of the Indian tribe in full war paint and feathers.

The Britishers, led by President Browne in a long white flowing robe, represented a group of inspectors sent to America to report on conditions in the automobile factories. These inspectors all reported to the leader and told what they had seen. All were dressed in white *robes de nuit* with the words "I am 'ere" inscribed on their chests. E. C. Paskall, one of the visitors introduced each of the inspectors as he made his report.



Members of the British delegation in comic costume used for their humorous entertainment given Thursday evening. J. Inglis Kerr holding the flag

Great Fun

Basil H. Joy lamented on speed of the 4d factory, Thomas Norton despaired of the Backyard (Packard) car, H. M. Buist criticized the Cadillaqua, which runs on milk. (Employees in the Cadillac plant are furnished milk.) The others told of fearful (?) conditions of other plants. One told of the Riverside (Hudson) factory; another dilated on the Charmers (Chalmers) plant; a third spoke of the 'Opmobile (Hupmobile), and so on. The criticisms were ludicrous but the satire struck home in many cases and provided continuous merriment for the entire audience.

Following the English performance, which brought down the house, the famous tribe of Indiana Indians led by F. E. Moscovics entered the arena with suitable war whoops and brandishing of weapons. An improvised stake had been arranged and the captives, Howard Coffin, chief engineer of the Hudson; David Fergusson, of the Pierce-Arrow; E. T. Birdsall, of the S. A. E.; Charles Wheeler, of the I. A. E., and R. H. Combs, of the Prest-O-Lite company, were all brought and tied to the stake and given various degrees of punishment, which varied from burning all the way down to the compulsory purchase of liquid refreshment for every one on board the boat.

The boat landed at Mackinac Island at 2:30, just at the adjournment of the professional sessions on Friday. Every one immediately started ashore with the idea of exploring the island until 9 o'clock, when the boat sailed.

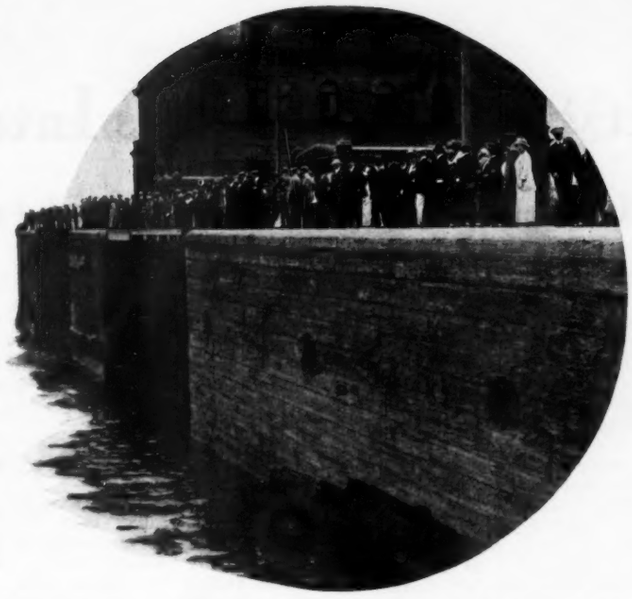
The amusements on shore consisted in roaming over the island, visiting the old fort, a relic of Indian days; watching the deer in the government reserve, admiring the picturesque beauty of Arch Rock, Sugar Loaf Rock, and a study of the old blockhouse.

The feature of the entertainment Friday night was the

one-act playlet entitled, "Reverse English on the Heat Treatment," rendered by the Metropolitan Section of the society. The play showed the spirits of the Britishers in the realms of purgatory. The time was A. D. 2000, and each spirit was called upon by the Metal-archangel, Herbert Chase, to explain the reason for his presence.

A Big Hit

The whole performance made an immense hit, the take-off on the Britishers keeping them as well as the rest of the audience convulsed with laughter. The shade of Father Dunlop, of tire fame, appeared with the original tire carried over his shoulder; Steam-bus Clarkson and his whiskers, were among the condemned ones, as was also Froggy Pollock, the only Frenchman in the party. The chaffing was taken in the best of good nature and every one considered that it was an excellent return for the mischievious gridiron performance of the Englishmen given on the evening before.



The engineers with friends inspecting the locks at the Soo. The power house for operating the gates is in the background. The semi-crescent shaped recesses in the wall are the gates for the lock, both being open and the water at low level, or empty dock

Saturday morning was occupied by the last professional session, and once more the engineers, who vibrated rapidly between fun and seriousness, set themselves to work to plow through the heavy program. The session was started promptly at 9 o'clock and at noon most of the work had been cleaned up. The boat landed at Detroit at 3 p. m.

On board the steamer a morning and evening four-page news paper was published. The paper was complete in every way, having an editorial department of five men, consisting of Lee Anderson, Charles M. Steele, W. L. Agnew, F. Ed. Spooner and G. J. Hopcraft, a composing room and an electric print shop. The full news of all the social affairs on the boat were perused eagerly by the entire party. A large supply of cuts taken on board before the boat left livened up the paper considerably.

This marked the close of the midsummer session of 1913. From the boat the party scattered to their various hotels. The Britishers, with a small complement of American engineers, rechecked baggage and prepared for the completion of their itinerary, embracing Cleveland, Buffalo and New England points. Three of them took a midnight train for the Pacific coast on a sightseeing trip of their own, and a few took up their residence in Detroit for a 10-day visit in more leisurely fashion to its factories. A motion was made and carried that it was the wish of the members of the S. A. E. assembled here that the summer session of 1915 be held on the coast. No arrangements were made for 1914. This year the increase in the number of ladies in the party was very marked.

The report on the monument for the late Henry Donaldson, past-president of the S. A. E., was read by H. M. Swetland. The monument is to be erected in 60 days. The amount subscribed by the society was $300, although the cost will be less than this.

CLEVELAND, O., June 9—The party of English and American automobile engineers, whose numbers had dwindled from 600 to fifty since leaving Detroit, arrived here yesterday.

Today's program included a visit to some of the more important factories in Cleveland. Among these were the works of the Foote-Burt Co., Cleveland Automatic Machine Co., National Acme Mfg. Co., Ferro Machine & Foundry Co., the White Co., and then optional visits to the Perfection Spring, Warner-Swasey, Peerless, Stearns, Winton, Baker and Rauch & Lang plants.

BUFFALO, N. Y., June 10—*Special Telegram*—Today the program of the visiting party of engineers called for a visit to the Pierce-Arrow plant in Buffalo and then an afternoon at the Falls of Niagara. The party was met at the pier on arrival from Cleveland at 7.30 this morning and after breakfast on the boat, a tour was made through the Pierce factory, which is now turning out 3,500 passenger cars and trucks a year. The afternoon was spent as guests of the Pierce company at the Falls where a supper was served. The party of English engineers here broke up into three, one-third going to New York, a third going to New England and the rest scattering through the West.

A group of the American engineers and their friends before the monument at Mackinac, in uniforms secured for celebration purposes

Quaker City Team B Wins Interclub Run

Protest Has Been Lodged Against One Member of the Team

GETTYSBURG, PA., June 7—Team B of the Quaker City Motor Club, consisting of Paul B. Huyette, Peerless; S. Leon Gans, Cadillac; R. L. Murray, Packard; I. T. Shoemaker, Ford, and H. M. Lyman, Packard, captured the trophy in the interclub reliability run which was successfully conducted today under the combined auspices of the Quaker City Motor Club, the Automobile Club of Philadelphia, the Automobile Club of Germantown and the Delaware County Automobile Club, from Philadelphia to Gettysburg.

The result is subject to revision, however, as a protest has been lodged against No. 62 of the successful team on a technicality involving the eligibility of Mr. Murray's car. The protest, if sustained, would give the trophy to Team A, also of the Quaker City Motor Club, which finished second with a penalization of 21 points. The team from the Automobile Club of Philadelphia finished third, 28 points being chalked up against it. Neither the Automobile Club of Germantown nor the Delaware County Automobile Club made any entry.

The event, the first of its kind for Philadelphia's motoring organizations, proved very popular and enjoyable. Very few frills and furbelows were attached to the rules for governing the contest. Entrants were divided into teams of five cars each for each club, the team finishing with the least number of points penalization being declared the winner. Only club members who were private owners not connected with the trade were eligible to compete.

No time or place was designated for the start from Philadelphia, contestants being free to leave from any point at any time and to choose any route, the only stipulation being to check in here before 3 o'clock to escape penalization. For each minute or fraction later one point was assessed against the car.

Weather conditions favored the start, and as a consequence all fifteen cars entered competed and came through with nothing more serious than punctured tires. Rain was falling by the time Lancaster was reached, but ceased soon. By the time tops had been hurriedly adjusted it was nearly over, and the run was made more enjoyable by reason of the laying of the dust.

Most of the participants took advantage of an invitation extended by the York Automobile Club to stop over and inspect that organization's cosy headquarters. Lack of time prevented the acceptance of a similar invitation from the Pullman Motor Co.

Headquarters were established here at the Eagle Hotel, and after checking in most of the tourists kept their cars in action for trips throughout the battlefield, which presented a striking appearance with its many tents being erected for the 3-day encampment of the Civil War survivors, starting July 1.

The start for Philadelphia will be made at irregular intervals to-morrow.

Officials of the run were P. D. Folwell, referee and representative A. A. A. Contest Board; manager, Dr. J. R. Overpeck, and B. H. Kirkbride, timer. The summary follows:

QUAKER CITY MOTOR CLUB (TEAM B)

No.	Entrant	Driver	Car	Arrived Gettysburg
63	I. T. Shoemaker	I. T. Shoemaker	Ford	12:00
62	R. L. Murray	R. L. Murray	Packard	1:40
61	S. Leon Gans	S. Leon Gans	Cadillac	2:08
60	Paul B. Huyette	Paul B. Huyette	Peerless	2:27
64	H. M. Lyman	H. M. Lyman	Packard	2:59

QUAKER CITY MOTOR CLUB (TEAM A)

54	F. C. Dunlap	F. C. Dunlap	Cadillac	2:23
51	A. T. James	Ralph James	White	2:50
50	F. G. Nixon-Niedlinger	F. G. Nixon-Niedlinger	Pierce-Arrow	3:00
53	Frank Hardart	Erma Hardart	Winton	3:07
52	Frank Hardart	May Hardart	Elmore	3:14

AUTOMOBILE CLUB OF PHILADELPHIA

1	Thomas Devlin	Thomas Devlin	Pierce-Arrow	12:30
2	Frank Silvers	Frank Silvers	Peerless	12:45
5	R. C. Schworer	R. C. Schworer	Lozier	12:52
4	W. O. Griffith	W. O. Griffith	Pierce-Arrow	2:32
3	Harvey Boyd	Harvey Boyd	Hupmobile	3:28

Mitchell-Lewis Glidden Pathfinder

MINNEAPOLIS, MINN., June 10—*Special Telegram*—Mitchell-Lewis Co., of Racine, has offered a Pathfinder car for the A. A. A. tour which will leave Minneapolis on June 14. Frank Hirbies, the driver, is on his way from Atlanta. The official folder of tour has been issued and mailed to all prospective entrants, and A. G. Batchelder, of A. A. A. will arrive at Minneapolis next Monday night for a mass meeting enlivened by a stereopticon lecture in the commercial club on the subject of the Glacier Park and the route of the tour.

Aitken To Go with Goux

INDIANAPOLIS, IND., June 9—Because of the excellent service he rendered Jules Goux, winner of the 500-mile race at the Indianapolis Motor Speedway, Memorial Day, Johnny Aitken of Indianapolis probably will go to Europe to assist the Peugeot team during the Grand Prix. Aitken may be accompanied by Howard Wilcox, who drove the Gray Fox in the Indianapolis event.

TACOMA, June 4—That Tacoma's dirt auto race track will be in such shape as to offer opportunity for the breaking of all existing dirt track records seems to be indicated by the trials made on it by Felix Magone, driving a Fiat. Magone made the 3.5-mile circuit in 3.14, or better than a mile a minute.

LOS ANGELES, CAL., June 7—It has been definitely decided that the Panama-Pacific Road Race will start from Los Angeles at 1 minute past midnight, July 4, and finish in San Francisco on the afternoon of the Fourth. Entries close June 10 and cars entering after that time will be forced to pay a larger entry fee.

New Sunbeam for Brooklands

LONDON, ENG., June 1—Great things are expected of a new Sunbeam which will shortly be put into operation on the Brooklands track, with the express purpose of cutting out a few world's records. This machine will have a twelve-cylinder engine and will be capable of developing well over 200 horsepower. The cylinders will be 3.15 inches bore by 5.9 inches stroke, set V-fashion at 60 degrees to each other.

The angle at which the cylinders are set has an important bearing on the torque obtained, and the performance of this latest speed machine will be watched carefully to note what effect the almost perfect torque characteristic will have on the speed capabilities of the car. A little consideration will show that with twelve cylinders at 60 degrees there will be an impulse at every 60 degrees, that is, six impulses a revolution, producing an extremely smooth result at the shaft.

Columbus Club's 200-Mile Race

COLUMBUS, O., June 9.—The Columbus Automobile Club through its committee on races and contests will give the third annual 200-mile race at the Columbus Driving Park, July 4. This event is the classic dirt track race of the country and is known far and wide. Twelve entries have been received, which is the largest number that can be started on the track.

The purse for the event is $3,000, which is supplemented by a number of trophies given by manufacturers and business men. The timing will be done by the Baker electric timer. Governor Cox of Ohio is an honorary referee and Mayor George J. Karb of Columbus an honorary umpire.

In order to lay the dust, the committee in charge of the event will spread 30 tons of calcium chloride on the track. Among the cars entered are several Mercers, one of which will be driven by Spencer Wishart, the winner of the 200-mile race last year. The Smada and several foreign cars which participated in the 500-mile race at Indianapolis will also start.

The Columbus Driving Park holds all records on dirt tracks from 75 miles up to 200 miles. It is also the first dirt track in the country to stage a 24-hour race.

The committee in charge of the event consists of L. M. Browne, chairman; Frank J. Girard, F. H. Thorpe, J. C. McIntyre and J. W. Means.

NEW YORK CITY, June 11.—The Long Island Automobile Club has announced a run for its members on June 14, which will start from the club house at 2:30 P. M., and end there at 6:30. The contestants will have to touch four points in lower Long Island, and who ever does this while making a minimum mileage during the afternoon, will be declared winner of the W. C. Bolton trophy.

French Grand Prix Has 36 Cyclecars

Most Are Two-Cylinder Types—Race on July 13

PARIS, FRANCE, June 4—Final entries for the French cyclecar Grand Prix race at Amiens have closed with a total of thirty-six machines. These comprise twenty-five cyclecars of 1,100 cubic centimeters cylinder capacity; one of 750 cubic centimeters; seven cyclecars or sidecars of 1,444; one of 750 and two of 500 cubic centimeters. All these machines will race together, but there will be distinct awards for each class. This is the first occasion on which cyclecars have been united for a pure speed contest on the open road. Doubtless, as the result of this contest this already popular type of vehicle will experience a boom.

Practically all attention has been centered on the 1,100 cubic centimeter class (67.1 cubic inches), showing that this type of machine is the one with the greatest future. Sidecars, which are exceedingly popular in England, and have met with a little favor in France, are allowed to race with the cyclecars. Nevertheless only six of these machines have been entered. A team of four Morgan machines, which are officially placed in the sidecar class are really three-wheel cyclecars. The French regulations, however, do not consider three-wheel machines as cyclecars.

A small number of four-cylinder motors have been entered in the race.

At present the twin cylinder motor holds the greatest amount of favor. The single is not fashionable, and the four-cylinder is either too costly to manufacture or is looked upon as not so efficient as a twin of equal cylinder capacity. A few of the firms make four-cylinder motors but prefer to put a twin in the race.

The cyclecar race will be run on the afternoon of July 13, being the day following the big car race. The course is a triangular one shortened from the big car course, with the same grandstands and tire pit arrangements. Fifteen rounds have to to be covered, giving a total distance of 163 miles.

Complete Entries French Grand Prix Cyclecar Race.

No.	Car	Type and Cooling	Bore and Stroke, Mm.	Driver
1	Bedelia	twin cyl. air	82 x 100	Bourbeau
2	Bedelia	twin cyl. air	82 x 100	Bonville
3	Bedelia	twin cyl. air	82 x 100	Contenet
4	Bedelia	twin cyl. air	76 x 82	Prevot
5	Violet-Bogey	twin cyl. water	73 x 130	Violet
6	Violet-Bogey	twin cyl. water	73 x 130	
7	Mathis	4-cyl. water	58 x 100	Mathis
8	Ronteix	4-cyl. water	62 x 80	
9	Noel	2-cyl. air		L. Noel
10	Du Guesclin	4-cyl. water	58 x 100	Du Guesclin
11	Automobliette	2-cyl. water	73 x 130	Ducruzel
12	Automobilette	2-cyl. water	73 x 130	Choudy
13	Super	twin cyl. water	74 x 120	Leveque
14	Violet-Bogey	twin cyl. water	73 x 130	
15	La Roulette	2-cyl. air	85 x 95	
16	Bolton-Precision	2-cyl. air	86 x 96	David C. Bolton
17	G. N.			
18	G. N.			
19	Duo Car	2-cyl. air	85.5 x 95	A. Francis
20	Duo Car	2-cyl. air	85.5 x 95	
21	La Roulette	2-cyl. air	85 x 95	
22	Sphinx-Globe	single, air	103 x 132	Canouel
23	Sphinx-Globe	twin water	90 x 77.5	
24	Marlborough	4-cyl. water	59 x 100	Samuelson
25	Ronteix	4-cyl. water	62 x 80	
26	Dew	2-cyl. air	85 x 88	W. D. Hawkes
27	Morgan	2-cyl. air		W. G. McMinnies
28	Morgan	2-cyl. air		N. F. Holder
29	Morgan	2-cyl. air	90 x 77.5	Morgan
30	Morgan	2-cyl. air	90 x 77.5	
31	Rene-Gillet	sidecar		
32	N. S. U.	sidecar		
33	Rene Gillet	sidecar		
34	Clyno	sidecar		
35	B. S. A.	sidecar		
36	Regal Green	sidecar		

Paris Show To Open October 17

PARIS, June 4—Paris will this year open the European show season with its annual exhibition in the Grand Palais, the inauguration of which has been fixed for Friday, October 17, and the closing day for Monday, October 27. The show will thus be open on 11 consecutive days, including 2 Sundays. The date chosen for this year's show is the earliest yet adopted for any motor exhibition in Europe. Henri Cezanne, who will again act as general manager of the Paris show, declares that this early show will allow the factories to gain practically 2 months. In France there is no important fall trade such as the American manufacturers enjoy. Thus, as soon as the active touring season is over there is a slackening off in factory activities and work is not taken up at full pressure until after the Paris show. By changing the show from December to October it is believed that this slack season will be reduced by 2 months.

Owing to the earlier date, there will probably be a smaller number of Parisians at the Paris show, but it is believed that the foreign visitors will be largely increased. Numbers of foreign visitors have not returned home in the month of October, and during this season buyers from business houses in all parts of the world are usually to be found in the French capital.

In its main features the Paris show will be similar to that of last year. It is organized by a joint committee representing the five leading trade associations of France and is run on a profit-sharing basis. Both pleasure cars and commercial vehicles are admitted, but the machine tool section has been abolished for lack of space. Accessory dealers are divided into two distinct classes: those manufacturing the goods they show and agents for other firms' goods. The minimum size of stands has been increased to 107 square feet, this having been done to make the cost of exhibiting too high for small dealers whose goods had but a slight connection with the automobile. The maximum size of stands is 861 square feet on the ground floor and 645 square feet on the first floor. All firms taking part in the Paris show must sign an agreement not to exhibit at any other show during the year in France or Algeria. Formerly this interdiction was only applied to the district around Paris. It has been extended to the whole of France in order to kill the small provincial shows which were springing up in all directions.

This year's show will be as brilliant as any of its predecessors. A very artistic uniform type of decoration will be adopted, and a considerable amount of money will be spent on illuminations. The opening ceremony will be performed by the president of the republic attended by most of the ministers. As the show lasts but 11 days, instead of 3 weeks as formerly, no free passes will be given out on the opening day. This will enable dealers to get to business immediately, whereas under present arrangements the hall has been so crowded with mere sightseers on the first day that no attempt could be made to transact business. The price of admission will be $1 on the opening day and on the following Friday and 20 cents on all other days. Instead of closing at 6 o'clock the show will keep open until 7 o'clock each evening.

The Paris show heading the list, there is every indication that the number of foreign exhibitors will be larger than usual. Naturally the entire French trade will be represented, and it is expected that English makers who have hitherto held somewhat aloof, will be present in big numbers. From inquiries having already been received from across the Atlantic, it is anticipated that American manufacturers will be present in big numbers. The French aviation show, which has previously preceded the automobile show, will this year be held in the Grand Palais during the month of December.

Humber Breaks Brooklands Records

LONDON, ENG., May 28—New figures in the short records of the Brooklands cubic capacity classes have recently been put up by the remarkably fast performance of the little 11.8-horsepower Humber, which succeeded in covering the flying mile in 44 56 seconds, representing a speed of 80.9 miles per hour. The dimensions of the four-cylinder engine fitted to this car are 2.77 inches bore by 5.12 inches stroke, giving a capacity of 123.6 cubic inches, which places it in Class B, for engines not exceeding 125 cubic inches.

The previous holder of the shorter records in this class was the Calthorpe, whose speed for the flying mile was 74.29. The Calthorpe engine, however, was slightly smaller than the Humber, having a bore and stroke of 2.74 inches by 4.92 inches giving a capacity of 115.7 cubic inches, well within the maximum for the class.

The short records captured by the Humber are: the flying half mile in 22.07 seconds, a spurt at the amazing speed for so small a car of 81.56 miles per hour; the flying kilometer in 27.44 seconds and the flying mile in 44.56 seconds. Besides these a new record for the ten-lap standing start was registered at the speed of 76.45 miles per hour, a gain of nearly 10 miles over the speed of the previously standing figure put up by the D. F. P. car with an engine of almost identical dimensions.

Court Upholds Hopewell

Rules That Vehicle Apron and Hood Co.'s Tire Cases Infringe His Patents

NEWTON, MASS., June 9—That the tire cases manufactured and sold by the Vehicle Apron and Hood Co., and handled in Massachusetts by the Linscott Supply Co., infringe patents Nos. 854,215 and 881,411 owned by Frank B. Hopewell of Hopewell Bros., Newton, Mass., was decided by Judge Dodge in the U. S. District Court of Massachusetts. The court stated that the three essential points covered by the two Hopewell patents mentioned were the annular form of the tire cases, the overlapping of the free edges of the sections which enfold the tires carried in the cases and the use of a cord in a longitudinal pocket, dispensing with the necessity of buttons and similar individual fastening devices. The combination of these features is original with the Hopewell patents, the court observed, and whatever evidences of prior art were referred to by the defendant did not embody that combination. There is even but one previous patent describing an endless tire case, that being Sloper's British letter of 1904, but this was considered impracticable by the judge. Other attempts made by the defendant to show that he made tire cases covered by the patents in 1905, while the alleged date of invention of the subject of the Hopewell patents was March 12, 1906, failed to be recognized as valid and convincing by the court, and plaintiff was entitled to an injunction restraining defendant from making and selling cases.

Ford Inforcing Cut-Rate Injunction

DAYTON, O.—A new phase was brought out by the Ford company in their nation-wide fight against the price-cutters today, when contempt proceedings were filed against the Union Motor Sales Co., of Dayton, O.

In the contempt proceedings the Ford people allege that the Union Sales Co. is guilty of violating the preliminary injunction issued in Judge Hollister's court here a few months ago. The petition was filed by Alfred Lucking and William Lucking of Detroit and Alfred M. Allen of Cincinnati, their attorney, against the Union Sales Co., Lucien A. Seward, its general counsel, and O. D. Nobel and H. J. Street, its sales managers.

In support of its charges the Ford Company filed with the court affidavits from residents of Wapakoneta, O., and St. Marys, O., whom the Ford company claim the Union Sales Co. called upon to have them buy cars at a price $50 to $500 lower than the regular retail price. An affidavit was filed from a newspaper at Wapakoneta to prove the assertion that an advertisement had been printed stating the cars would be sold for the low price. The court orders the defendant to appear June 26.

DETROIT, MICH.—While it has been announced definitely in some sources that the Ford Motor Co. is to equip all of its cars next year with wire wheels, James Couzens states that it has not yet been definitely decided to shift to this type of wheel although it is being seriously considered.

Grant Patent Owners Threatened

NEW YORK CITY, June 9—The preliminary injunction recently granted by Judge Ray in the U. S. District Court to James D. Hurd, the Consolidated Rubber Tire Co., and the Rubber Tire Wheel Co. against the James Goold Co., was reversed on appeal to the U. S. Circuit Court of Appeals, Second Circuit, New York. Judges Lacombe, Coxe and Noyes, who heard the case, were of the opinion that the three respondents who were maintaining suits against several New York tire dealers despite an order enjoining them from conducting such suits, were exposing themselves to the possibility of contempt of court proceedings, although the decision given by the tribunal admits the validity of the Grant patent in question. The judges were also of the opinion that the Goold tire infringed the Grant patent.

Court Sustains Prest-O-Lite Injunction

INDIANAPOLIS, IND., June 9—In the federal court here, Judge Albert B. Anderson has denied a petition of the Searchlight Gas Co. that an injunction against it in favor of the Prest-O-Lite Co. be suspended pending an appeal of the case to the United States Court of Appeals.

Judge Anderson at the same time entered a final decree in the case. The Searchlight company is perpetually enjoined from refilling Prest-O-Lite gas tanks before the Prest-O-Lite trademark is obliterated. Judge Anderson held refilling the tanks before the trademark was removed would be an infringement of trademark rights and unjust and unlawful competition.

NEW YORK CITY, June 9—In the Appellate Division of the N. Y. Supreme Court, the Searchlight Gas Co. argued against the Prest-O-Lite Co., against the latter's complaint that Prest-O-Lite tanks had been filled with Searchlight gas and that this action constituted a violation of the New York business law, trademark section.

The argument of the Searchlight Co. was fourfold: First, that the trademark law protects only foods, drugs and medicines, and that acetylene is not included among these; second, that only such products as come in a wrapper of no value are protected, while the law does not refer to products coming in a container sold like the Prest-O-Lite Tank; third, that the words of the Prest-O-Lite trademark refer to the tank and not to the gas in it; fourth, that the Prest-O-Lite Co. is a foreign corporation in the state of New York and as such is excluded from the benefit of the trademark law.

CINCINNATI, O., June 9—When the involuntary bankruptcy proceedings of the Eiseman Magneto Co. *et al.* vs. the Ohio Motor Car Co. came up for a hearing before Judge Hollister today on the motor car company's motion to dismiss and on objections filed to the motion by one of the creditors, the Judge after hearing the arguments denied the motion to dismiss and ordered the company to plead further.

The attorneys in support of their motion to dismiss the case argued that as the creditors of the motor car company had accepted a dividend of 15 per cent. on their claims in the receivership proceedings in the Hamilton county common pleas court that acceptance barred them from maintaining proceedings in bankruptcy.

Automobile Securities Quotations

Securities quotations were without an exception lower than last week. There were fallings off throughout, led by rubber stocks, Firestone common declining 29 and Goodyear common, 15 points. Studebaker and Willys-Overland also suffered severe setbacks. The entire movement was the result of the railroad decision rendered this week.

	1912		1913	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., com	110	115	150	..
Ajax-Grieb Rubber Co., pfd	90	97	95	100
Aluminum Castings, pfd	100	..	98	100
American Locomotive Co., com	42	42½	27	28
American Locomotive Co., pfd	106	108¼	100	102
Chalmers Motor Company, com	..	..	125	135
Chalmers Motor Company, pfd	..	..	98	102
Consolidated Rubber Tire Co., com	15	17	12	18
Consolidated Rubber Tire Co., pfd	55	60	60	75
Firestone Tire & Rubber Co., com	269	271	230	240
Firestone Tire & Rubber Co., pfd	106	108	105	107
Fisk Rubber Company, com	..	..	..	..
Fisk Rubber Company, pfd	..	..	..	100
Garford Company, preferred	99	101	..	97½
General Motors Company, com	34	35	24	26
General Motors Company, pfd	74	75	70	72
B. F. Goodrich Company, com	81½	82	25	26
B. F. Goodrich Company, pfd	108½	109	88	89
Goodyear Tire & Rubber Co., com	269	271	..	302
Goodyear Tire & Rubber Co., pfd	100	105	98	99½
Hayes Manufacturing Company	..	104	..	90
International Motor Co., com	27	32	4	6
International Motor Co., pfd	90	94	10	15
Lozier Motor Company, com	45	55	15	20
Lozier Motor Company, pfd	..	..	..	92
Maxwell Motor Co., com	..	..	2	5
Maxwell Motor Co., 1st pfd	..	..	30	35
Maxwell Motor Co., 2nd pfd	..	..	8	12
Miller Rubber Company	159	161	135	145
Packard Motor Company	104½	106½	95	100
Peerless Motor Company, com	..	..	45	50
Peerless Motor Company, pfd	..	..	..	96
Pope Manufacturing Company, com	30	31	10	12
Pope Manufacturing Company, pfd	75	76½	40	46
Portage Rubber Co., com	..	..	35	40
Portage Rubber Co., pfd	..	..	90	95
Reo Motor Truck Company	8	10	..	11¾
Reo Motor Car Company	23	24	20	22½
Rubber Goods Mfg. Co., pfd	..	..	100	110
Studebaker Company, com	36½	38	20	23
Studebaker Company, pfd	95½	96	82	85
Swinehart Tire Company	100	105	85	90
U. S. Rubber Co., com	..	..	53	54
U. S. Rubber Co., 1st pfd	..	..	100	100½
White Company, preferred	107½	108½	107	110
Willys-Overland Co., com	..	..	50	55
Willys-Overland Co., pfd	..	..	76	85

Chevrolet Buys Little

To Make 8,500 Cars for 1914—All Cars Now To Be Named Chevrolet

DETROIT, MICH., June 10—*Special Telegram*—The Chevrolet Motor Co. has purchased the entire business of the Little Motor Car Co., Flint, Mich., both being subsidiary to the Republic Motor Co. By the terms of the transfer the Little company goes out of existence as a separate, affiliated concern of the Republic Motor Co., and the cars made in the Little plants will henceforth bear the name of Chevrolet. The factory buildings occupied by the Little company in Flint were formerly the Imperial Wheel Works and the Randolph motor truck plant. The absorption of the Little concern takes effect immediately and the move is due to a plan for centralizing the manufacture of Chevrolet cars in Flint. It is proposed to make a complete line of cars there and the factories are to be in operation by August 1 with a schedule of 8,500 machines for 1914 ranging in five models from the small roadster selling at $690 to a six-cylinder type at $2,500. This will include several new models.

The Chevrolet company controls the sources from which it obtains motors and other parts. Its authorized capitalization is $2,500,000, of which $500,000 is preferred stock and the balance common. Along with the other changes several have been made in the personnel of the Chevrolet organization. N. W. C. Durant, formerly president of the concern, takes the first vice-presidency, while C. M. Begole assumes the duties of president. W. H. Little, who was general manager and second vice-president, leaves the organization entirely, and A. B. C. Hardy, who was general manager of the Little company, takes over the complete general managership and becomes a vice-president. C. R. Hatheway remains secretary, while W. S. Ballenger succeeds Dr. E. R. Campbell as treasurer. T. S. Johnston will be general manager of sales.

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DETROIT, MICH., June 11—*Special Telegram*—The machinery, stock and equipment of the Flanders Mfg. Co., Pontiac and Chelsea, Mich., which went into the hands of the Detroit Trust Co., as receiver some time ago, have finally been sold to Harris Bros. & Co., Chicago, Ill., for the lump sum of $225,000. This concern has also secured a 3-months option on the plant and land for $175,000. The receivers will distribute a 25 per cent. dividend to the Flanders creditors next month, while another is expected to be given out in the fall.

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Willys Reduces Hours But Not Pay

TOLEDO, O., June 9—John N. Willys has established a precedent in the automobile industry by announcing a general reduction of working hours throughout the Overland factories in Toledo, Lima, Elyria and Elmira, without a reduction of wages. The announcement provides for the substitution of the 54-hour week by a 50-hour week, all wages paid now remaining the same.

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New Western Freight Rates

NEW YORK CITY, June 11—The Western Classification Committee which held a session in St. Louis during last April, has made several changes in railroad rates which will take effect on June 30. Below, the alterations as given out by James S. Marvin, general traffic manager of the Automobile Chamber of Commerce, are enumerated:

Article	Present Rate	New Rate
Chains, automobile tires in bbls. or boxes:	Less carloads, 1st class.	Less carloads, 2nd class.
Fire apparatus, self-propelling.	Carloads, minimum, 24,000 lbs. Class A.	Specific rating installed on same basis as automobile rates, viz.:
	Less carloads, various ratings as originally intended for horse-drawn and hand apparatus.	Less carloads, D-1.
		Carloads, 10,000 lbs. min., subject to Rule 6-B, 1st class.
Folding tops:	1½ times 1st class, carloads or less carloads.	Folded flat, in boxes or crates, less carloads 1½ times 1st class.
		In packages named, carload min. weight 10,000 lbs., subject to Rule 6-B, 1st class.
Automobile springs:	2nd class, carloads or less carloads.	In boxes, bundles or crates, less carloads, 2nd class.
		In packages, or loose, carload minimum weight 36,000 lbs., 3rd class.
Front axles, mufflers and radius rods:	Axles, 2nd class, carloads or less carloads.	Front axles, in bundles or loose, less carloads 2nd class.
	Mufflers and radius rods 1st class, carloads or less carloads.	Mufflers, in bbls., boxes or crates, less carloads 1st class.
		Radius rods, in boxes, bundles or crates less carloads, 1st class.
		Front axles, mufflers and radius rods, in packages, or loose, straight or mixed carloads, min. weight 30,000 lbs. 3rd class.
Rear axle assembly with drive shaft attached:	1st class, carloads or less carloads.	In crates, less carloads, 1st class.
		In packages or loose, carload minimum weight 30,000 lbs., 3rd class.
Fenders, mudguards, mud shields or running boards, steel finished:	1st class, carloads or less carloads.	In boxes or crates, less carloads, 1st class.
		In packages or loose, straight or mixed carloads, minimum weight 30,000 lbs., 3rd class.
Frames:	1st class, carloads or less carloads.	Loose, less carloads, 1st class.
		Loose, carload minimum weight, 20,000 lbs., subject to Rule 5-B, 3rd class.
Dashes and steering gears:	1st class, carloads or less carloads.	In boxes or crates, less carloads, D-1.
		In packages or loose, straight or mixed carloads, minimum weight, 30,000 lbs., 3rd class.
Automobile wheels:	Without rubber tires: Finished, in boxes, crates, or wrapped, carloads or less carloads, 1½ times 1st class.	Without rubber tires.
		Finished, in boxes, crates or wrapped, less carloads 1½ times, 1st class.
	In the white, loose, carloads or less carloads, 1st class.	In the white, loose, less carloads, 1st class.
		In the white or finished, in packages or loose, carload minimum weight 30,000 lbs. 3rd class.

Market Changes for the Week

Another break in tin occurred this week, due to small demand on large lots. A drop of $.75 was followed by lower prices and better demand for small lots, closing on Tuesday at $45.50 per hundred pounds. Lead was quiet and irregular, dropping $.02 1-2 per hundred pounds, closing at $4.32 1-2. The main feature of interest in the copper markets last week was the liquidation of speculative contracts of standard on Tuesday in London with a sympathetic lowering in prices and dullness in New York City. Electrolytic and Lake dropped $.00 1-8 and $.00 1-4 a pound respectively. Linseed oil dropped on Friday to $.47 at a loss of $.01. The situation in the market for petroleum underwent no change last week. The consumption continues liberal and the market retains a firm tone. Cottonseed oil fluctuated throughout the last week, the highest price at $7.22 and its closing price at $7.21 at a gain of $.06 per barrel.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.07½	.07½	.07½	.07½	.07½	.07½	.....
Beams & Channels, 100 lbs.....	1.61	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, ton.....	26.50	26.50	26.50	26.50	26.50	26.50	.....
Copper, Elec., lb....	.15⅛	.15	.15	.15	.15	.15	—.00⅛
Copper, Lake, lb....	.15½	.15½	.15¼	.15¼	.15¼	.15¼	—.00¼
Cottonseed Oil, lb..	7.15	7.18	7.22	7.21	7.16	7.21	+.06
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	.....
Fish Oil, Menhaden, Brown	.34	.34	.34	.34	.34	.34	.....
Gasoline, Auto, 200 gals.....	.22¼	.22¼	.22¼	.22¼	.22¼	.22¼	.....
Lard Oil, prime....	.95	.95	.95	.95	.95	.95	.....
Lead, 100 lbs.....	4.35	4.35	4.35	4.35	4.35	4.32½	—.02½
Linseed Oil.....	.48	.48	.47	.47	.47	.47	—.01
Open-Hearth Steel, ton.....	26.50	26.50	26.50	26.50	26.50	26.50	.....
Petroleum, bbl., Kansas crude....	.88	.88	.88	88	.88	.88	.....
Petroleum, bbl., Pa., crude.....	2.50	2.50	2.50	2.50	2.50	2.50	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Silk, raw Italy....	....	4.35	....	....	4.45	4.50	+.15
Silk, raw Japan.....	.....	3.70	....	....	3.80	3.75	+.05
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.....	46.00	46.00	46.00	46.15	45.50	45.25	—.75
Tire, Scrap.....	.10	.10	.10	.10	.10	.10	.....

Postal Trucks Ordered

No Bids To Replace Cancelled Orders for 100 Trucks—Parcels Post for Dominion—Managers Leave

WASHINGTON, D. C., June 10—*Special Telegram*—Specifications for 20 trucks of 1,500 pounds capacity and 20 tri-cars of 700 pounds capacity for the parcels post were issued today by the Post Office Department. Bids for same will be opened at 2 o'clock on June 20 by the purchasing agent of the Post Office Department, from whom specifications and blank forms of proposal can be obtained. The specifications are strict and bidders must strictly conform to them.

These trucks and tri-cars are to take the place of 100 motor trucks ordered by former Postmaster-General Hitchcock on bids submitted in March, the orders for which were cancelled as being not in conformity with law.

Canada To Get Parcels Post

OTTAWA, ONT., June 9—The House of Commons today passed the parcels post bill, so that the matter of arranging details is now in the hands of the postmaster-general of the dominion. The zones of the system will consist of the provinces, but New Brunswick, Nova Scotia and Prince Edward's Island will compose one single zone. Local zones of 20 miles radius in which very low rates are to be put in force are to be established about all post offices to assist local merchants. The rates to be fixed by the postmaster are to be so set that the system will be self-supporting, and the sizes and weights of parcels will be the same as regulated by the Postal Union.

Mais Factory Partly Burned

INDIANAPOLIS, IND., June 9—Fire last Wednesday night partly destroyed the plant of the Mais Motor Truck Co. at LaSalle street and the belt railway tracks. The company, however, believes there will be no serious interference with its business on account of the fire. Firemen were hampered in their work and wereable to give but little aid, because there are no water mains in the immediate vicinity of the plant.

The fire started in the stock building, which with the storage room and oil building were totally destroyed. The firemen were able to save the office and main factory building. Some of the company's patterns and several unfinished machines were destroyed.

McGuire Leaves Maxwell Company

DETROIT, MICH., June 9—The Maxwell Motor Co. has announced the resignation of William F. McGuire from the vice-presidency and production managership, he having tendered his resignation at the meeting of the company's executive committee on Tuesday last.

Alco Builds Dumping Truck Body

NEW YORK, June 10.—Demonstrations of a new body-dumping gear were made here to-day by the American Locomotive Co. The new dumping gear was designed by the Alco engineering department, and is the first dumping gear which this company has itself produced, although various types made by body builders have been applied to Alco chassis. The new gear was designed for motor car use and borrows nothing from devices designed for horse wagons. It is power driven and differs from others in its class in that it can raise the body to an angle of 65 degrees. This extreme angle enables it to successfully dump sticky substances, as was demonstrated both at Providence and New York, when on both occasions asphalt was readily dumped.

The countershaft of the gearset is extended forward to a set of inclosed reduction gears, consisting of worm gears and a train of spur gears. The power from these gears is transmitted to a transverse shaft beneath the forward part of the body. At the ends of this shaft are two bell cranks, which operate on the body through two long connecting-rods. A lever at the side of the driver's seat operates a clutch on the end of the countershaft extension. The mechanism operates in but one direction, and if not shut off at the extreme angle it will continue its motion until the body is restored to its horizontal position, at which point a trip is actuated which releases the clutch and locks the body.

The tail-gate is actuated by a vertical rod, so that it automatically opens when the body is raised. The dumping mechanism is independent of the gearset, and may be operated while the truck is in motion. The dumping gear may be disengaged at any point and the body held stationary. Releasing the countershaft clutch permits it to return to horizontal from any point by gravity. The pivot on which the body rocks is situated behind the axle and below the frame, so that the tail gate dumps to a very low angle. The mechanism is patented.

Moskovics with Jones Starter

CHICAGO, June 9—F. E. Moskovics, who recently resigned as sales manager of the Remy Electric Co., of Anderson, Ind., has bought an interest in the Jones Electric Starter Co., Chicago, makers of the Jesco Lighter Starter for automobiles. He will have charge of the sales and at the next directors' meeting will be elected an officer in the company.

Buffalo Firm Seeks Injunction

BUFFALO, N. Y., June 10—Action has been started in the federal court here by the Buffalo Specialty Co. against Theodore P. Meinhard, who is operating under the name of the Battery Emporium for alleged infringement on a patent for automatically stopping punctures and leaks in rubber tires. The plaintiffs ask the court to issue an injunction restraining the emporium from making, using or selling the product. An accounting is also asked to determine amount of damages.

KANSAS CITY, KAN., June 9—In a recent decision the Kansas Supreme Court has made a ruling that the owner of a public garage is responsible for the acts of any of its employes by which damage is done to the cars of any patrons who may have left their property in charge of the concern.

NEW YORK CITY, June 9.—George H. Duck of the American Locomotive Co. has resigned his position as general service manager of that concern and will leave on July 1. His plans for the future are not definite as yet, but it is highly probable that he will remain in New York City and in the automobile business.

MILWAUKEE, WIS., June 9—The use of other than the official number plates issued by the motor registry bureau of the State of Wisconsin is declared to be unlawful by the decision of the attorney general. The practice of using pasteboard numbers in case of the loss of the official plate or plates has been generally followed, but hereafter arrests will be made. It developed that cars were being operated continually without having been registered and the $5 fee paid, the owner or driver claiming, when accosted that he lost his plates and was waiting for duplicates.

MILWAUKEE, WIS., June 9—The Milwaukee Motor Co., Milwaukee, has brought suit in the circuit court against Ernst G. and Elise K. Miller to collect $45,538.83, claimed to be due on stock certificates or shares accepted by the defendants at the reorganization meeting of the company on May 1. The complaint states that $37,794.50 has been paid on the certificates.

NEW YORK CITY, June 9.—Among the various companies that have declared dividends of late, the Standard Oil Co. of New York leads with a stock dividend of 400 per cent. The Texas Co. has declared a dividend of 1¼ per cent, being the regular quarterly. The Rubber Goods Mfg. Co. will pay, on June 16, 1¾ per cent. on its preferred and 1 per cent. on its common stock.

One of the new all-inclosed armored war trucks used by the Italian army during its recent operations in Tripolis and Cyrenae. This is one of the most up-to-date types manufactured

Lay Out Lincoln Road

Lincoln Highway Association Formed To Build Transcontinental Road— Joy Is Pathfinder

DETROIT, MICH., June 4—*Special Telegram*—The Lincoln Highway Association has just been formed in this city for the promotion of a continuous connecting transcontinental highway reaching from the Atlantic to the Pacific. H. B. Joy, president of the Packard Motor Car Co., has been made president of the association, and A. R. Pardington has been made secretary. Mr. Joy starts on a trip to the coast the end of this week, accompanied by Frank H. Trego, research engineer of the Packard company. The trip is to be made over the proposed route in a Packard car and Mr. Trego is to take engineering notes as the run progresses on the various construction needed, such as bridges, kind of roads, and so on. After the trip he will make to the association a report based upon the findings of the trip. The national headquarters of the association are located in the Dime Savings Bank Building.

Leaving Detroit the route will follow the beaten path south through Michigan and will run about 40 miles south of Chicago. From this point a list of towns to be touched through to the coast follows:

Valparaiso, Ind.; Geneva, Ill.; De Kalb, Dixon, Sterling, Morrison, Clinton, Iowa; Grand Rapids, State Center, Grand Junction, Council Bluffs, Omaha, Kearney, North Platte, Big Spring, Kimball, Cheyenne, Laramie, Medicine Bow, Rawlets, Granger, Ogden, Brigham City, Kelton, Kelton Camp, Lucin, Tacoma, Montello, Cobre, Fenelon, Wells, Duth, Elko, Elko Camp, Elko Hot Baths, Ruby Range Camp, Eureka, Austin, Alpine Ranch Camp, Alpine Camp, Dry Lake, Falen, Hazen, Wadsworth, Reno, Truckee, California Donner, Lake Camp Colfax, Auburn Folsom, Sacramento, Stockton, Dublin, Dublin Camp and Oakland Ferry.

Minnesota Has 36,000 Cars

ST. PAUL, MINN., June 7—Prosperity is indicated by the volume of applications for automobile licenses in the office of the secretary of state. The average a day of new applications is about 200. Under the law of 1911, automobiles register for 3 years, so the registrations for that year have not expired and the average application today is for a new car. It is estimated by the secretary that there will be more than 45,000 cars in Minnesota by December 31. Although it is unnecessary for owners of the same cars in 1911 and 1912 to take out licenses this year, the number issued in 1912 and 1913 has reached 36,500. Some idea of the rapid increase in automobile ownership in the state is in the following figures: 1909, 7,000; 1910, 12,000; 1911, 18,000; 1912, 29,000. In 1913 7,500 tags have been issued.

Connecticut Has Enough Road Money

HARTFORD, CONN., June 9—The $5,000,000 bond proposition introduced in the Connecticut legislature for the betterment of trunk line roads has been indefinitely postponed. As the legislature has adjourned there is no possibility of raising the money. The regular state appropriation for roads will, however, help along very nicely. When former commissioner Macdonald retired from office in favor of Charles J. Bennett he turned over to his successor nearly $3,000,000, which would meet outstanding and contracted obligations. Had not the appropriation been made the highway department would be a useless fixture.

Missouri Road Law Held Invalid

ST. LOUIS, MO., June 3—The state supreme court, sitting at Jefferson City yesterday, knocked out the benefit assessment road district law, under which hundreds of thousands of dollars' worth of road improvement had been planned. The law, according to Justice Brown's view, is unconstitutional from the viewpoint that non-landholders are denied the right of voting in the formation of a district under this law, and that the tax sought to be imposed was arbitrary and unequal. The special road district law had been in force since 1909 and fixed the minimum area for road districts organized under it at 2,000 acres.

The constitutionality of the law was attacked simultaneously in two cases, one from Kansas City, in which W. W. Embree and others sought to enjoin the Kansas City-Liberty Boulevard road district of Clay county from issuing and selling bonds to the amount of $70,000 and from levying taxes to pay the interest principal of same. The Clay county circuit court refused the injunction. Justice Brown directed the court to grant the injunction. The other case was from Madrid county and affected the Kings highway district.

Renewed Oil Suit a Possibility

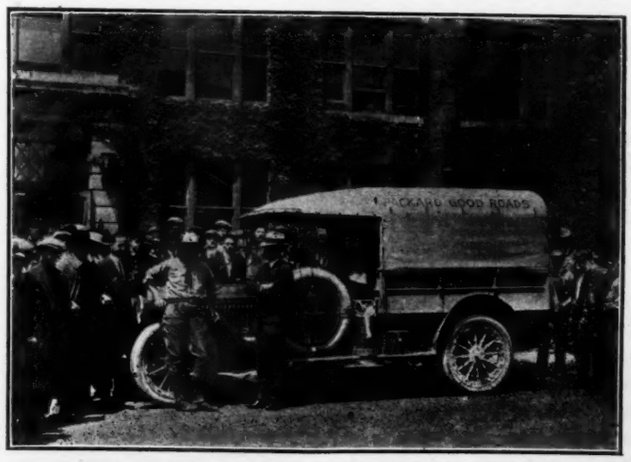
WASHINGTON, D. C., June 9—It is being rumored here that a renewed investigation may be made regarding conditions in the oil industry. As a result of a report made by the former attorney-general's assistant's, a doubt has arisen in the minds of the administration as to whether the former oil trust has been effectively dissolved. Attorney-General McReynolds declined, however, to make a statement on the situation at the present time.

Massachusetts 1913 Registration Big

BOSTON, MASS., June 9—With but 5 months of the present year gone by, almost as many motor cars have been registered in Massachusetts as were put on the books for the entire 12 months of 1913. Moreover, the increase so far as compared to 1 year ago for the same period shows a gain of about 30 per cent., with the rush still continuing. Also the receipts for the first 5 months this year are within about $18,000 of the total for the entire year of 1912. The figures compiled by the automobile department of the Highway Commission at Boston show that up to June 1 there had been registered nearly 60,000 vehicles. Of this number some 48,490 were those of private individuals, about 6,200 were registered by manufacturers and dealers, and 4,790 were motorcycles. In the entire year of 1912 the total number of cars were about 60,700, including 50,132 private machines, about 5,500 used by manufacturers and dealers, and 5,034 motorcycles. So far this year there has been taken in a total of $598,731.10, or about $130,000 more than for the corresponding period of last year.

Made-in-Racine Exposition Opens

RACINE, WIS., June 9.—Gov. F. E. McGovern of Wisconsin formally opened the first Made-in-Racine Industrial Exposition at noon today, and, with addresses by Mayor Walter Goodland and officers of the Racine Commercial Club, the big show was set in motion. Nearly 200 Racine factories are exhibiting their products and the extent of the motor car industry and allied trades never was brought home so forcibly to Racine people as at this time. The Mitchell and Case companies are exhibiting completed cars, chassis, engines and parts, and the Piggins Motor Truck Co. has on display several models of commercial vehicles. Thirty-seven other concerns are exhibiting forgings, stampings, castings and other parts, appliances and accessories for cars and trucks. The show will conclude Saturday evening, June 14.



H. B. Joy, president of the Packard Motor Car Co., and of the Lincoln Highway Association, ready to start on his trip to the Pacific as pathfinder for the Lincoln highway

THE AUTOMOBILE

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S.A.E. Keeping Up-to-Date

LAST week's session of the Society of Automobile Engineers and the visiting members of the Institution of Automobile Engineers of the British Isles gave many evidences of the efforts made by the engineers to have their respective organizations leaders in the work of meeting exigencies or engineering conditions as they may arise in the automobile field. Many of the papers had a distinctly up-to-date atmosphere, dealing particularly with current movements in the industry. The paper and discussion on wire wheels, the use of metal wheels for motor trucks, and discussions on batteries for starting, indicated well the society's activity.

This activity might have gone a step or two farther and dealt with other subjects that are of paramount importance today. Time could have been spent to the greatest advantage in a general session on self-starters. At the last automobile show the self-starter was the word on the lips of everyone, and, although there was very general ignorance on the subject then it is equally certain that there is much today to be learned. No topic should have been of greater interest to the engineers in general, and no better opportunity will be afforded before the new models are out for going into this starter situation.

One other movement gives promise of receiving more attention during the next few months, namely, gear-shifting devices in which neither lever nor pedal is used. Not a few makers are looking into the question in an exhaustive manner and a good compilation on the subject, bringing it up to the present, would have been valuable to all members of the society.

The committees of the S. A. E. continue to do their valuable work of standardization as well as research. The work of a committee must always be considered the life-blood of an organization, and no better thermometer of health and activity can be had than the committee work.

One of the visiting engineers gave the excellent suggestion of carrying the standardization work into factory construction, into factory equipment and into factory operation. His plan carries with it the standardizing of all units comprising the factory. It goes further and deals with standardizing overhead shafting for driving machinery, suggesting that all electric motors be of uniform power, that all shafting be in uniform lengths or multiples of a given unit; that hangers for the shafting bearigns be standardized, so that in case any factory rre-arrangements become necessary it is possible to make changes with practically no expense and in a comparatively short time, whereas with a non-standardized factory arrangement each change or re-arrangement of machinery, or of a department from one part of the factory to another means a loss of valuable time and a considerable amount of money expended in addition.

American factories can take up such a movement and such a step lies within the zone of the S. A. E. in that the society has already dealt not only with questions of design and production but also with the merchandising of the product.

While congratulating the society on the excellent work it is doing, on its good financial condition and also on its steady growth in membership it is nevertheless true that more continuity of effort might be displayed in following up topics successively at later sessions. A year ago the question of arranging for some standard form of motor testing was gone into. At the January session a report was made but at the present session this work was largely neglected and the report passed on to the winter session. Motor testing is a most important feature, particularly in these days when higher motor efficiency is demanded. Many of the factories acknowledge how deplorably weak they are in adequate testing equipment. Because of this the subject should be vigorously pushed at each general session of the society.

Another criticism of the program of last week was that there were too many papers and not enough discussion. Every member agrees that discussion is the life of any subject. Discussion analyzes a subject for those who have missed the exact perspective of the question as presented in the address or paper read. When too many papers are read there is not enough time for free discussion. One of the policies of the I. A. E. is that one paper with discussion is sufficient for a 3 or 4-hour session. This is good policy for the S. A. E. to follow. If papers are not of sufficient importance to develop discussion then printing them in the S. A. E. Bulletin is sufficient. Many members are prevented from entering into discussions largely because they are aware of the lack of time. It is generally true that when several papers are read at one session the auditors become too tired to follow with the requisite mental alertness.

To Teach Massachusetts Children Safety

Movement Similar to American Museum of Safety League's Work in New York.

BOSTON, MASS., June 2—Motor accidents in which children are the victims will undoubtedly be decreased in Massachusetts in the near future due to the splendid plan outlined by the officers of the Automobile Legal Association and carried out successfully. It is a campaign of education, one not undertaken with the idea of advertising the organization, but solely to decrease accidents. Already it has cost the organization several hundred dollars, but the money has been well expended, for school children all over the state are now memorizing 10 simple rules for their own protection. Already more than 35,000 copies of them have been distributed upon request and the demand still continues. Miss Ripley of the Boston School Committee proposes to set the rules in rhyme and have the children sing them so that they may be memorized more easily and quickly before the vacation season begins.

Early in April the association sent the following letter to all the superintendents of schools in Massachusetts, and to the editors of various newspapers, also its members:

Dear Sir:—As the automobile season is about to begin and the streets of cities and towns will be soon crowded with that class of vehicles, we desire to inaugurate some sort of a movement by which school children and automobilists may co-operate for their mutual safety and the protection of school children in every possible way. This is a very large problem, which we are well aware will cost a great deal of money, but our association is now in a position to assist in this matter, and we write to ask if you will favor us with your suggestion as to how this best can be accomplished.

We have under contemplation a proposed set of say, six, eight or ten short rules with the idea of sending these rules to the school authorities of the cities and towns of Massachusets, asking them to have the children memorize them and repeat them in school at least once each week, but it seems to us if we go one step further and organize the children in some sort of a protective league, and make them feel that they are part of an organization which exists for their protection and interest, the movement would be more successful. We, of course, do not expect that education is needed by the children alone, and we are well aware that many automobilists need to be aroused to the necessity of greater care on their part, but the greater need of education, in our opinion, lies in the direction of pointing out to children who have not reached the age of discretion, a way in which they can co-operate with the movement. Hoping that we may hear from you at your earliest convenience with any suggestions that you may be able to think of, we remain.—AUTOMOBILE LEGAL ASSOCIATION.

The result was astonishing. The school authorities took it up from Boston to the end of the state. Suggestions came pouring in from many places giving the plan a good impetus. With this state the officials of the A. L. A. began their plans. The wheat was sorted from the chaff and so another letter was sent out this time to the superintendents of the schools. It said:

Dear Sirs:—Recently we mailed a letter to you asking for suggestions as to the best way to decrease the large number of automobile accidents to school children. Two suggestions, among many, have been made by a majority of the superintendents. The first is that an appropriate sign be erected from 200 to 300 feet on each side of school buildings. The second is that it would be well to have from eight to ten short rules printed on light cardboard and distributed to the pupils while in school each week until memorized.

From the replies received and from our own experience, we are convinced the sign should have the word "school" in large white letters on a red background. Such a sign would at once flash on the mind of the automobilist the thought of danger and of caution. In order that the interest of the children in this movement may be aroused at once, the suggestion has been made that we offer prizes to the children in the grammar schools, including all grades, for the best set of rules furnished. As we are looking for the idea rather than for perfect English—grammar and composition need not necessarily be considered. Each rule must not contain more than fifteen words.

We offer for the first prize, $25; for the second, $15; for the third, $10; for the fourth, $5, and for the next fifteen, $1 each, for a rule on each of the following suggestions:

1. What should a child do *before* crossing a street?
2. If playing in the street, what should a child keep in mind?
3. Why should a child not play in a street frequently used by automobilists?
4. What should a child do if standing in the middle of the street and automobiles are coming both ways?
5. What danger is there in stealing a ride upon an automobile?
6. In case a child, or any person is struck by an automobile what is the first thing to do?
7. Should a child throw a stone at an automobile and why?
8. Should an older child look after a younger and why?

These suggestions might be copied on the blackboard by the teachers for the guidance and asasistance of the children in writing the rules. It may interest you to know that we shall also publish, at the same time the rules are finally adopted, a number of similar rules for the guidance of motorists. We ask your immediate co-operation in seeing that these rules actually originate with and are written by the children, whose full name and address should be given. Kindly impress upon the teachers that this contest will close on May 1 next.

After the rules received have been finally adopted we will notify you to that effect and give you the opportunity to order as many of them as you like, mailed to you at our expense.—AUTOMOBILE LEGAL ASSOCIATION.

Again the co-operation on the part of the school authorities was such that the suggestions were received and put into practice. Immediately there began the contest for the prizes from all over the state, for the teachers realized what a great benefit it would be to train the children to protect themselves while on the streets, particularly during the summer vacation. The association then took up the suggestion relative to signs and to all the mayors of cities and the chairmen of the boards of selectmen in every town throughout Massachusetts there were mailed letters seeking their co-operation.

Many replies have been received favoring this suggestion. Meanwhile the contest for the prizes offered by the association went merrily on. It was finally decided and the winner was a boy of 10 years of age. The winners represented cities and towns from one end of the Bay State to the other. Second, third and fourth prizes went to girls. The work will be resumed in the fall when the children return to school.

This movement is similar in its aims and purposes to the work being carried on by the American Museum of Safety, which has headquarters at 29 West Thirty-ninth street, New York City. For the past 8 months this organization has been engaged in conducting an educative campaign in the New York schools, endeavoring to instill into the school children an understanding of the dangers of traffic so that they may be persuaded to give up the street as a playground and especially to abstain from such dangerous pastimes as tag, roller skating, pushmobiling and "hitching on behind" automobiles and motor trucks.

Both organizations realize that due diligence in the operation of automobiles is only a casual factor in the situation. The criminal negligence of pedestrians and children is largely responsible for the increasing number of accidents in vehicle traffic. Restrictive legislation aimed at automobile owners and drivers is not the remedy required. The education of school children is the most logical method of approaching the trouble for when handled intelligently the serious side of the matter and the possibility of maiming or loss of life are impressed upon their minds in such a way that they instinctively protect themselves by increased carefulness.

How Children May Avoid Accidents

1—Before crossing a street, stop. First look to the left, then to the right, and if safe, go ahead.

2—If playing in a street remember you have selected the most dangerous place possible, and that the public streets are not made to play in.

3—In playing in the street bear in mind that automobiles come swiftly and silently, and, if they strike you, are very apt to kill you.

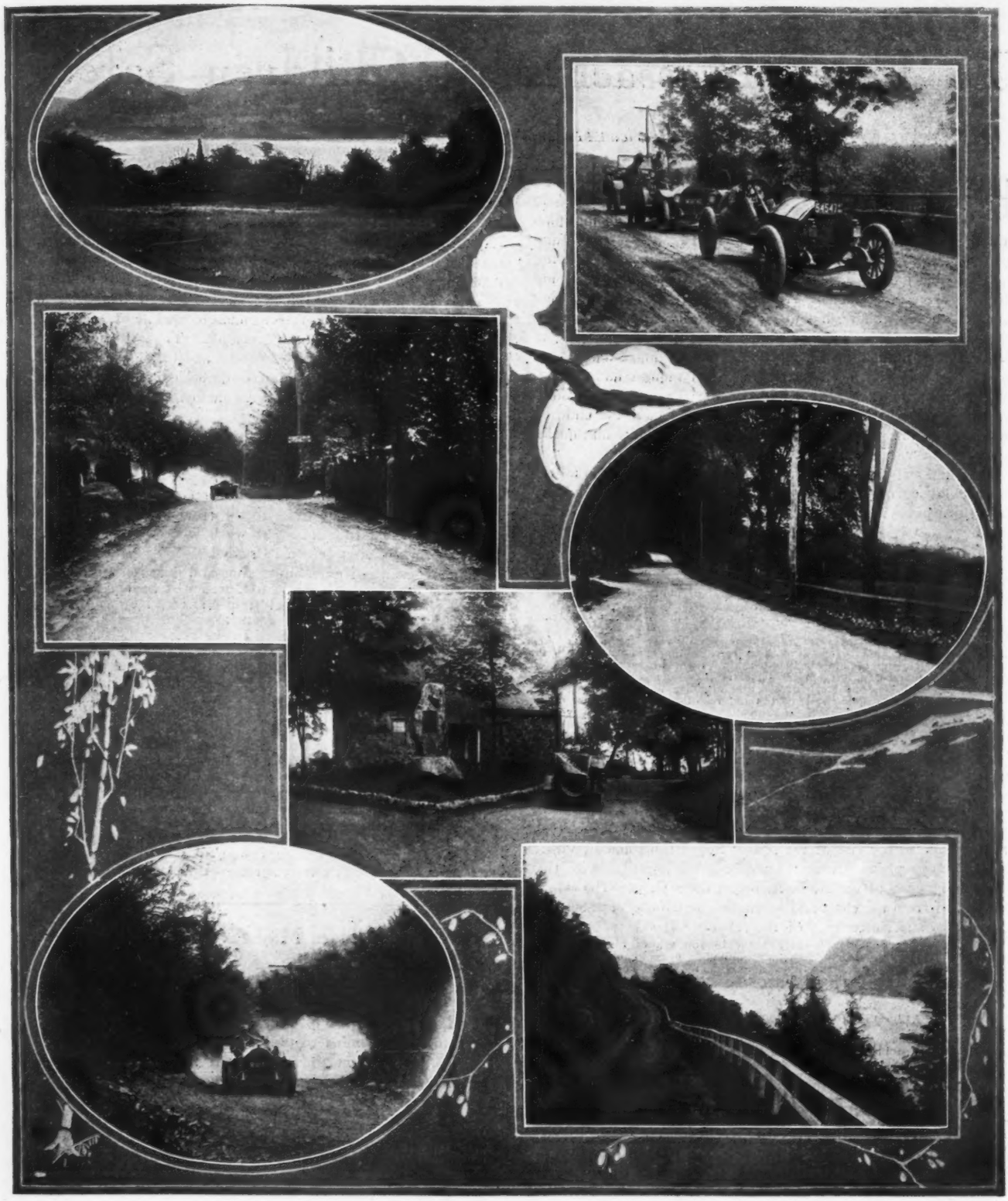
4—If standing in the middle of the street and automobiles are coming both ways, keep perfectly still.

5—The danger in stealing a ride is that if you are not thrown off, you are apt to be run over by another vehicle when you jump off.

6—In case anyone is struck by an automobile, first take the number, but be sure you take it accurately.

7—If you throw a stone at an automobile you may injure the occupants, or cause the driver to lose control; besides it is mean and cowardly. Don't do it.

8—Always look after a younger child because the younger cannot think quickly and does not know the danger.



SCENES along the road on the recent Catskill Reliability Run, held by the Motor Dealers' Contest Assoc. of New York City. The trip was an ideal one and the eleven cars had the best of weather conditions and fine roads on their 262-mile trip. The first afternoon's run to Newburgh was an economy contest and also a reliability run. This was won by the Paige-Detroit. The second day's run was divided into forenoon and afternoon runs. The forenoon run was from Newburgh to Haines Falls in the Catskills. This occupied but a part of the time, the remainder being taken up with a hill-climb, in which each vehicle had to compete, the driver alone riding. The Mercer won this. The afternoon run of the second day was made over good roads back to New York City by way of Newburgh and Tuxedo. At the finish when the eleven cars were checked, eight had perfect road scores. The economy contest proved one of the most interesting, in that the method of determining the winner gave the small car practically an equal chance with the largest machines. It would be difficult to select a better 65 miles for a fuel test.

ABOUT 5,000 children of assorted ages, colors and nationalities, from twenty-five of the city's institutions journeyed in automobiles from New York city to Glen Island on June 5. This was the ninth annual Orphans' Day of the Orphans' Automobile Day Assn. of New York. It required 344 motor vehicles of all kinds and descriptions to transport the children from the lower end of Central Park up Broadway and over to Glen Island, where they had luncheon and also visited all the various amusement places at that resort, returning to town, tired but happy, in time for supper. This outing was the largest of this character ever held. The time and effort which had been expended in making it possible by S. A. Miles, the association's president; Senator W. J. Morgan, W. S. Silver, F. J. Griffin, J. J. Korbel, R. H. Smith, H. A. Bonnell, P. B. Pugh and others of its officers and directors were more than repaid, however, by the delight which the day in the country under perfect June skies brought to the little orphans. The pictures show the little ones in passenger and commercial cars and having a good time generally.

Operators' Licenses Are Revokable in Bay State

Three Speed Convictions Per Year a Reason—Police Officers Report to Highway Commission of Accidents

By J. T. Sullivan

BOSTON, MASS.—In whom should the power of suspending or revoking licenses to operate a motor car be vested? This question has created considerable interest during the recent legislative sessions where there has been an effort made to alter the law. Where the aim has been to vest this authority in one person, there has been general opposition to such a movement; but, on the other hand, where the power rests with a commission there has been a more general feeling of safety on the part of the motorists. In this state the power to control motor vehicles is vested in the Massachusetts Highway Commission, and has been for some years, and up to the present time there has been no complaint about the way it has handled cases. The general automobile law vests the commission with power to do this work, and under certain sections the law operates automatically in the suspension or revocation of a license. Last year the commission suspended or revoked 546 licenses. This was 186 more than in 1911, when 360 licenses were taken up. Some were given hearings, either by requesting them or by being notified by the commission to appear after the investigators had made their report on a matter.

On the question of speeding the law provides for a speed that is reasonably safe and proper at 20 miles on the highways, 15 miles in thickly settled districts, and 8 miles per hour at intersecting ways or where the view is obstructed.

Limited Fines for Park Speeders

Then there are the park regulations as to speed. If anyone is convicted three times in any calendar year of violating these provisions of the state law it provides: "The commission shall forewith revoke the license of the person so convicted, and no new license shall be issued to such person for at least 30 days after the date of such conviction, nor thereafter except in the discretion of said commission." This section is intended to check the speeding motorists, and as the commission may withhold the license indefinitely, why it can rule the motorist off the road as long as it wants to do so. Last year but one license was suspended, and but two in 1911, which shows that after a person has been convicted once or twice he is very careful not to get caught again because he knows it means a loss of his license, which is more of a deterring factor than the fine.

The fines for such speeding is not more than $25 for first offense—the minimum fine being dropped this year—$25 to $50 for second and $50 to $100 for third offense. In some instances cases may be filed, but there is no imprisonment. As the courts send a record to the commission the motorist cannot dodge it unless he gives another name or commits perjury.

It is under section 20 of the state law that the commission does most of its suspension work. Under one part where it may assign as a reason "operating improperly," a driver may figure in an accident that might be avoided if careful, and when the facts become known the commission gets busy and drops the man's privilege. Last year 152 were dropped and 137 the year before. This section of the law reads:

> The commission may suspend or revoke any certificate of registration or any license issued to any person under the provisions of this act, after due hearing, for any cause which it may deem sufficient, and the commission may suspend the license of any operator or chauffeur in its discretion and without a hearing, and may order the license to be delivered to it, whenever it has reason to believe that the holder thereof is an improper or incompetent person to operate motor vehicles, or is operating improperly or so as to endanger the public; and neither the certificate of registration nor the license shall be reissued unless, upon examination or investigation, or after a hearing, the commission determines that the operator or chauffeur should again be permitted to operate.

When that section first went into effect some of those who lost their licenses and had some money simply hired a chauffeur who had a license, and then operated as usual, so the commission had a penalty put in so that now it says:

> Any person convicted of operating a motor vehicle in this commonwealth after his license to operate has been suspended or revoked, and any person convicted of operating or causing or permitting any other person to operate a motor vehicle after the certificate of registration for such vehicle has been suspended or revoked, shall be punished by a fine of not more than $100 or by imprisonment for 10 or by both such fine and imprisonment.

So if a chauffeur lets another operate who is not entitled to he is liable to be fined and imprisoned and also lose his license under the other section of improperly operating, etc.

The reckless driver, and the one driving while intoxicated, is the fellow that gets punished, too, both ways. Policemen of late have been making charges of reckless driving where the charge should have been overspeeding, because under the latter the fines were not as large as the reckless driving. This section of the law has just been amended so that a minimum penalty of 2 weeks has been added now. This includes a number of other things, and automatically revokes the license. It reads:

> Whoever upon any way operates an automobile or motor cycle recklessly, or while under the influence of intoxicating liquor, or so that the lives or safety of the public might be endangered, or upon a bet, wager or race, or who operates a motor vehicle for the purpose of making a record and thereby violates any provisions of sections sixteeen and seventeen of this act, or who knowingly goes away without stopping and making himself known after causing injury to any person or property, or who uses a motor vehicle without authority shall be punished by a fine of not more than $200, or by imprisonment for a term of not less than 2 weeks and not more than two years, or by both such fine and imprisonment; and if any person be convicted a second time of operating an automobile while under the influence of intoxicating liquor, he shall be punished by imprisonment for a term of not less than 1 year and not more than 2 years. A conviction of a violation of this section shall be reported forthwith by the court or trial justice to the commission, which shall revoke immediately the license of the person so convicted. If it appears by the records of the commission that the person so convicted is the owner of a motor vehicle, or has exclusive control of any motor vehicles as a manufacturer or dealer, the commission may revoke the certificate of registration of all motor vehicles so exclusively owned or controlled. Whenever any person so convicted appeals, the commission shall suspend forthwith the license of the person so convicted, and shall order the license delivered to it, and shall not reissue said license unless such person is acquitted in the appellate court, or unless the commission in its discretion, after an investigation or upon a hearing, decides to reissue it. No new license or certificate shall be issued by the commission to any person convicted of a violation of this section until after 60 days from the date of such final conviction, nor thereafter except in the discretion of the commission.

Highway Commission Watches Mishaps

This is a very strong provision in the law for it reaches the dealer as well as the owner, and, in fact, the manufacturer, and nothing can be done any way until after 60 days from the final disposition in court. Some drivers used to appeal from lower court sentences and get their licenses back until the section was strengthened by making the suspension date from the first conviction. Last year ninety-nine lost their licenses and forty-one the year before for reckless driving; fifty-six in 1912 and fourteen in 1911 for being intoxicated; and seventeen and eight, respectively, for not stopping after an accident. So that it is pretty hard to dodge the law on the matter.

The highway commission has an investigating force that goes out not only in the Bay State, but into other states and investigates accidents, particularly those resulting in serious injury and

death. These investigators have police powers, and when they make a report the commission decides whether or not a hearing is necessary. And upon their reports, too, depend the suspension or revocation of licenses to a great extent. The law requires that

The chief officer of the police department of every city and town, and the chairman of the selectmen of such towns as have no regular police department shall notify the commission forthwith of the particulars of every serious accident which happens within the limits of their respective town or city in which a motor vehicle is involved, and as a result of which a death occurs or appears likely to occur, and shall also, if possible, ascertain the name of the operator of such vehicle and notify the commission of the same. Every such officer, upon the request of the commission, shall demand forthwith the license of any operator and the certificate of registration and number plates or seal of any motor vehicle situated within the limits of the city or town where such officer resides when said license or certificate has been suspended or revoked by the commission, and shall forward the same to the commission. Whenever the death of any person results from any such accident, the commission shall suspend forthwith the license of the operator of the automobile or the certificate of registration of the motor cycle involved in said accident and shall order the said license or certificate to be delivered to it; and the commission shall revoke the same unless, upon investigation or after a hearing, it determines that the accident occurred without serious fault upon the part of said operator or chauffeur. No operator or chauffeur whose license is revoked under the provisions of this section shall be licensed again within six months after the date of the suspension, nor thereafter except in the discretion of the commission.

Under this provision when a death occurs the license is suspended automatically and then the burden of proof is placed on the motorist to prove he was not at fault. Last year 115 licenses were suspended for deaths, and ninety-five the year before.

The law also provides that the judges shall not only send in the abstract records of conviction of motor offenses, but it also requires them to make recommendations relative to licenses when they feel it should be done, as per the following section:

A full record shall be kept by every court and trial justice in this commonwealth of every case in which a person is charged with a violation of any provision of this act or of any other act relative to motor vehicles or to the operation of such vehicles, and an abstract of such record shall be sent forthwith by the court or trial justice to the commission. Said abstracts shall be made upon forms prepared by the commission, and shall include all necessary information as to the parties to the case, the nature of the offence, the date of the hearing, the plea, the judgment and the result; and every such abstract shall be certified by the clerk of the court or by the trial justice as a true abstract of the record of the court. The commission shall keep such records in its main office, and they shall be open to the inspection of any person during reasonable business hours. Courts and trial justices shall, upon their own initiative or upon the request of the commission or its agents, furnish to the commission the details of all particularly flagrant cases which may be heard before them; and they may make such recommendations to the commission as to the suspension or revocation of the licenses and certificates of registration of the persons defendant in such cases as they may deem necessary.

Then there is the Safe Roads Automobile Association and the Highway Safety League, both of which comprise motor owners, who make it a business to do what they can to check reckless and dangerous driving by investigating accidents on their own account and notifying the highway commission of any flagrant cases that come under their notice. Other individual motorists also aid the commission, and the Massachusetts Automobile Operators' Association, comprising more than 500 chauffeurs, also report instances that their members see. All these things help to rid the highways of the reckless drivers. This year, too, the commission has got a law passed whereby motorists from other states come under its jurisdiction and they are amenable to our laws now as well as our own motorists.

Drivers Known in 97 Per Cent. Death Cases

Some evidence of the fact that many drivers do not get away after figuring in fatal accidents is shown by the death statistics, where 135 accidents resulting in 142 deaths were investigated. and out of all 135 accidents in but four instances did the driver get away without being found out. That is a remarkable record. The suspensions for not stopping puts a check to that.

The commission sits every Wednesday on motor cases, and at least one member is on hand, and sometimes two. Occasionally all three members are present if the matter is a serious one. Being empowered to summon witnesses and administer oaths the commission sets as a court. It has the power to pay fees to witnesses similar to the Superior Court. At these hearings everyone has a chance to be heard, and motorists may be represented by counsel. When the case is finished the commission announces its decision, usually the following Saturday, in a statement sent out to the press and also posted in the office of the commission, and there is no appeal from it. Usually a hearing is held within a week or two after an accident when a person asks for one, or about the same length of time after the investigators make their report. These investigators do not lose any time getting busy, for they realize first-hand facts are always best. Here is a specimen statement following the weekly list of hearings:

The following tabulation give some idea of the work and the causes of suspensions and revocations for the past 2 years.

Action Taken on Formal Complaints After Hearing	1911	1912
Licenses revoked	4	7
Licenses suspended	11	17
Registration certificate cancelled	1	..
Complaints placed on file	8	9
Complaints dismissed	8	6
Operators cautioned	3	12
Totals	35	51
Suspensions and Revocations		
Licenses revoked	95	190
Licenses suspended	254	325
Licenses cancelled	3	...
Registration certificate sus. or rev	2	6
Dealers' regis. certificate suspended	1	...
Motor cycle registration suspended	5	14
Motor cycle registration revoked	...	11
Totals	360	546
Suspension and Revocations on Convictions		
Suspension and Revocations on Convictions	75	182
After hearings on formal complaints	15	24
After investigations on which hearings were given in some cases	270	340
Totals	360	546
Causes of Suspensions and Revocations		
Reckless operation	41	99
Under influence of liquor	14	56
Not stopping after accident	8	17
Accidents causing death	95	115
Improper operation	137	152
Three overspeeding convictions	2	1
Operating without owner's permission	24	23
Improper person	21	48
Other offenses	18	35
Totals	360	546
Accidents Resulting in Death		
Registration certif. revoked, owner having no license	1	5
Licenses revoked	15	28
Motor cycle registration revoked	2	..
Licenses suspended, reinstated after investigation and hearing	62	64
Licenses suspended, final hearing pending	14	22
Motorcycle suspended, final hearing pending	1	..
No action, no Mass. license	10	10
No action, operator unknown	..	4
No action, death of operator	5	15
Totals	110	143

Advantages of State Law Enumerated

William D. Sohier, chairman of the Massachusetts Highway Commission, expresses his views on this subject as follows:

"I think this is the only state which is doing very much in this line of work. It takes at least 2 days' time of the board every week reading reports, hearing cases, etc. We have hearings every Wednesday from 9 a. m. to 5 p. m. upon complaints, or as a result of reports made by our investigators, and suspend or revoke licenses. We never revoke without a hearing, except in cases where operators are convicted of reckless driving, etc. We do suspend on report of our investigator.

"I regard the automobile law of this state as a model law in very many respects. For instance, when a man is convicted of any of the major offenses in the courts, like operating while intoxicated, or going away without stopping and making himself known after causing injury to any person or property, or taking a car without authority, causing death, etc., upon receipt of the court record his license is suspended if he appeals and revoked if he does not appeal. It can only be reinstated 60 days thereafter.

"In the case of a fatal accident the license is suspended automatically until we have a chance to investigate the case. Unless the board can certify that the accident happened without serious fault on the part of the operator, the board is obliged to revoke the license and it cannot be restored until after the expiration of 6 months from the date it is revoked.

"We have investigators who immediately look into these matters. At the present time there are five employed, and we will probably appoint more at an early date.

"We also investigate accident cases. When we think the operator was to blame in a serious accident we revoke the license. We suspend the license if it is not a serious case, and notify the operator to come in and let us know why it should not be revoked. You will notice in our report that we have a number of such cases a year. In my judgment it has very much more effect in producing sane operation than any number of small fines imposed by the courts.

"A man in this state has to be very careful not to get convicted of operating recklessly or under the influence of liquor."

The Engineering Digest

Body-Builders in Germany Bid for Importers' Business—Steel Wheels and Versatile Carbureters Made Compulsory for Hard-Service War Trucks

Economical Furnace for Isolated Factories—Advice on the Interpretation of Oil Pressure Gauges—A Trend Toward Simplified Wheel-Drives—Formula for Making Steel Parts Look Like Bronze—Tungsten Recommended for Terminals.

BODIES for Exported Chassis.—A development which may prove of interest to exporters of American cars, either directly or indirectly, transpires in the form of an inquiry from the Prussian Department of Commerce and Trade to the Chamber of Commerce of Berlin. A Prussian manufacturer of automobile bodies applied to the Department for a permit to import foreign-made chassis free of duty, with a view to fitting them with German bodies and then re-exporting the complete vehicles. A similar application had been refused by the Department five years ago, because at that time it seemed inadvisable to facilitate the importation of foreign chassis in competition with those of German make. Now, however, the Department was informed that all German automobile factories were barely able to take care of their orders and also that they were more and more making the bodies for their chassis themselves, with the result that those manufacturers who had made a specialty of body-building had been compelled to reduce their working forces in several instances, especially as orders from abroad for German-made vehicle bodies were only rarely received.

In reply to the inquiry on this subject the Chamber of Commerce replied to the Department that the body-builders and the automobile builders were of opposite opinions. The body-builders reported that automobile manufacturers in France and Italy under the present conditions frequently had their chassis fitted with bodies in Belgium, just because the opportunity to get the work done in Germany was lacking. The granting of the application, and of others of like character, was in their opinion therefore urgently needed. The automobile manufacturers, on the other hand, and especially those who built mainly chassis, feared that foreign chassis-builders perhaps could have bodies built more cheaply in Germany than elsewhere and that the proposed innovation would give them an advantage over German manufacturers of completed cars in the foreign markets. This fear was expressed especially with reference to those American manufacturers who turn out chassis in great numbers.

In one instance it was also mentioned as an objection that foreign concerns would take advantage of the proposed measure to equip their chassis with bodies which have become popular in Germany and would then offer the completed vehicles for sale in the German home market, simply making good the deferred payment of import duty in each case.

The Chamber of Commerce did not consider it proved, however, that foreign builders could not get their chassis equipped with suitable bodies just as cheaply and well in neighboring countries—for example in Belgium—as in Germany, and held that they could therefore probably give German manufacturers the same competition now as under the proposed arrangement. And as the latter would at least benefit the German body-builders, while the present condition did not benefit any German industry, the Chamber of Commerce would recommend that the application be granted. In view of the uncertainty in the commercial development and so as to forestall abuse of the privilege asked for, a proviso should be incorporated in the arrangement, however, calling for the re-export of the imported chassis, together with their German bodies, before the expiration of a stipulated time limit.—From *Automobil-Rundschau*, May 15.

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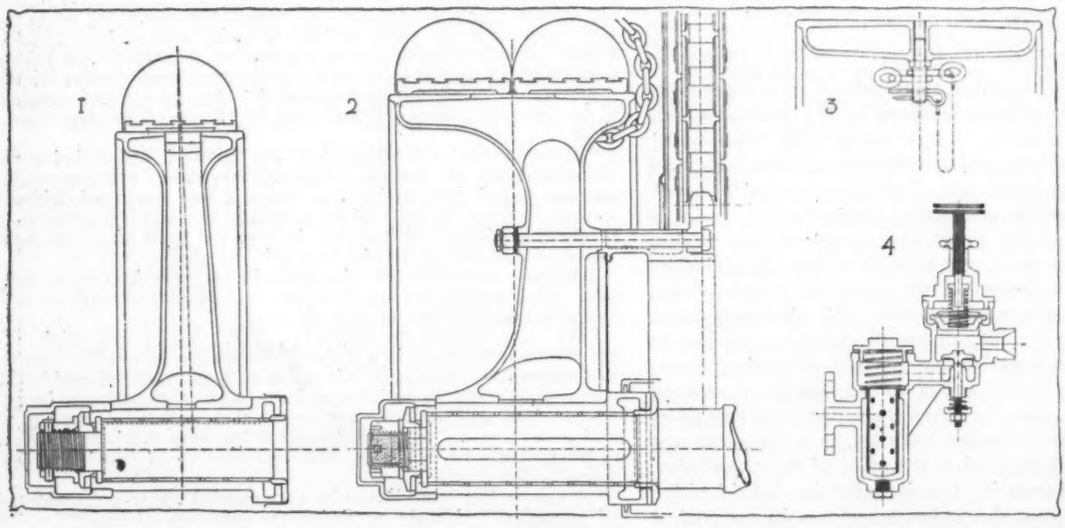
REVISED Requirements for Subsidized German Trucks.—Every year the Prussian ministry of war makes a few changes in the regulations by which those manufacturers of motor trucks must be governed who wish to give their customers the benefit of the subsidy accorded for vehicles which are considered suitable for military transportation service and which are expressly made subject to drafting for maneuvers, mobiliza-



Figs. 1 and 2—Reproduction from scale drawings representing the construction of front and rear cast steel wheels which has been made obligatory for subsidized motor trucks in Germany—giving also their tire equipment

Fig. 3—Section of rear wheel rim between spokes, showing the mode of attachment of traction chains for both rear and front wheels

Fig. 4—Obligatory type of valve for regulating full feed pressure derived from the exhaust gases

tion or war. The subsidy consists in a bonus on the purchase amounting to 1,800 mark for a single motor truck and 3,000 mark for a train, composed of one motor truck and one trailer wagon, and in yearly payments of 800 and 1,200 mark, respectively, after the second, third, fourth and fifth years during which the vehicles have been maintained in good order.

The requirements for motor trains have not been changed much since last year, but some features which were declared desirable have been made obligatory in the new set of regulations, the purpose of the army authorities being to standardize the equipment as much and as fast as experience gained during each current year will permit. When definite conclusions are reached with regard to some feature of design or materials, scale drawings embodying these conclusions are made at the experimental department of the army and are provided with annotations from which it can be seen what details still remain optional with the builder. Among the features which have become standardized this year, the wheels are the most important. They must now necessarily be made of steel, and the construction drawings show them as cast steel wheels with hollow spokes and rims. The bearings are plain bronze bushings. In both rear and front wheels, studs for the attachment of traction chains are screwed into the inside of the rim between spokes. Figs. 1 and 2 and 3 show the design with the dimensions and annotations omitted.

Other standardized features are the valve for regulating the pressure feed of the fuel by means of the exhaust gas, which is shown in Fig. 4, the coupling between the motor truck and the trailer (which is similar in design to that of old-fashioned railway car couplings, except that the coupling pin is chained), the connection between the brakes of the truck and those of the trailer, the measurements and nature of tires, which must be of the solid rubber type.

Among other provisions it is noticed that sprags are still required for both vehicles of a train, that the maximum speed of 16 kilometers per hour must be enforced for the empty as well as for the loaded vehicle by means of a governor acting upon the motor at third and fourth speeds, that the service brakes must be water-cooled and the wheel brakes compensated and that the carbureter must be adaptable by adjustment for use with benzol as well as light or heavy gasoline.—From *Der Motorwagen*, May 10.

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NEW Recuperating Furnace.—A furnace which seems adapted for a series of work requiring different temperatures, from very low to very high, and in which low-grade fuels may be used, is described by E. Schmatolla in *Der Praktische Maschinenkonstrukteur*. Fig. 8 shows the construction in three sectional views, the second being a vertical section through the low rear portion shown in the plan-section. The pit A, the chamber *f* which serves for the generation of gas and the two heat-recuperators B are built into one piece of masonry. The registers *e* and the sheet-steel slide *t* alone control the direction of the currents of gas, air and flame. The pit A can, according to requirements, be constructed for the heating of stills, vats, crucibles or any other object. When the fireclay plate covering the opening *g* is removed and the registers *e* are closed, the chamber *b* communicates with A, and, if at the same time the slide *t* covers the three canals, *m*, *n*, *m*, the gases pass directly from *b* to A by way of *g* and thence along both sides of A through the canals *b*, the recuperators B (which consist in piles of fireclay bricks), the canals *k*, *l*, *m*, the slide *t* and the canal *n* to the flue *o*.

When the furnace is started and so long as it is desired to work at low temperatures, only a thin layer of fuel is placed upon the grate in G, and the flames pass by the route mentioned. In order to heat the flue and promote the draft at the beginning, the fireplace can also be connected directly with the flue. Then, if it is desired to increase the temperature progressively fuel is added by successive stages and, likewise, the access of air coming in over the registers *e* is gradually increased; the flame forms in the pit A and passes to the flue by way of the recuperators where the heat of the hot gases is absorbed by the firebricks.

When the slide *t* becomes very hot, or, in other words, when useful heat is escaping, it is better to reverse the direction of the flame and utilize the exhaust heat for preheating the air used for combustion. To this end, the opening *g* is closed, one of the registers *e* (the one to the left in the illustration; not lettered) is opened and the slide *t* is pushed to one side, so that it covers only the openings *m* and *n*, leaving the other opening *m* (to the left) free to permit the arrival of air. The air now comes in through the canal *l-k* to the left, passes through the recuperator B to the left, absorbs the heat there stored and arrives strongly heated by way of canal *b* to A. Before entering, it mixes with the generator gas coming from the canals *c*, *d*, *h*, *f* to the left and produces a very hot flame which traverses the pit A. The waste gases pass through the other recuperator and reach the flue by way of *k*, *l*, *m*, *t* and *n*.

When, after some time, the air for combustion has absorbed all the heat in the recuperator to the left, the direction of the gas currents is again changed by closing register *e* on the left side, opening the other register *e* and pushing the slide *t* to the left.

By this system the temperature can be raised practically to the maximum obtainable with atmospheric air. With very slight changes the construction of the furnace can be adapted for operation with producer gas or natural gas as fuel.—From *Revue de Métallurgie*, May.

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READING the Oil Pressure Gauge.—Among the more or less practical hints offered to motor car users by writers for the European press many are double-edged, being more eloquent in pointing out shortcomings which ought to be remedied by the makers of cars and accessories than in designating the best method for getting along with things as they are. The advice given frequently proves more than was intended, and in other cases it suggests a condition which does not exist, as when repairs are described which never should be made, because they cost more than replacements of parts and fail to bring about the alloy-steel strength which is required. Reflections of this order, from which the principal upshot is a sharp realization of the advantages to be gained by making such judicious selections from among the cars and accessories which the market affords that the troubles for which remedies are offered will not arise, are suggested in this instance by the complicated advice on the reading of oil pressure gauges which an expert presents to the French automobile public, and from which the first inference would be that certain improvements of these gauges might be more easily accomplished than the training of the public to the proper use of those to which the writer refers. As the subject is not often treated, the advice is repro-

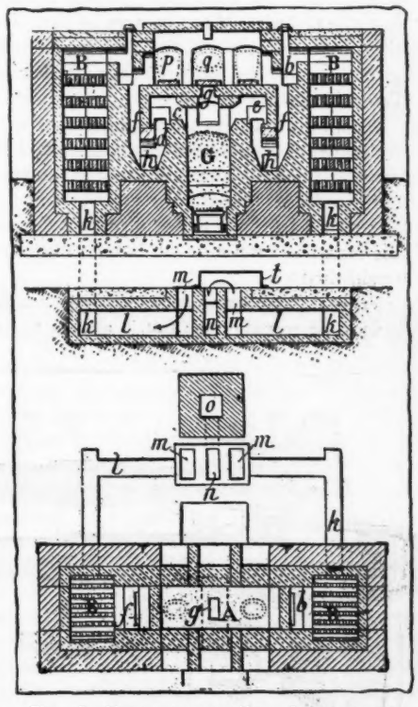

Fig. 8—New recuperating furnace—an element in factory economy and convenience

duced in full—the translation being almost verbatim—as follows:

The hand of the oil pressure gauge does not only indicate the pressure existing in the oil ducts; it is not only the movements of the hand which should be observed but also their nature.

Sometimes, in the morning, when the car is started, the hand rises to the top of the dial. Then, after a few jumps, it suddenly falls back to zero. It is because the oil has thickened, and, though it has been sent into the organs of the motor, it does not return fast enough for feeding the pump; it is accumulated, for example, in front of a filter. The motor should therefore be allowed to turn over slowly.

If this incident occurs regularly, a more fluid oil should be used. If, in spite of all care, the pump frequently runs idle, the filter placed at the entrance to the pump must be very much fouled and should be cleaned.

On the road, the indicator hand remains nearly stationary. If it drops low when the car is slowed up, all is well.

If the hand remains at a high figure throughout all speed variations of the motor, this indicates that the oil is too heavy and meets too great resistance to its circulation. One cannot know in that case whether the oil really passes through the ducts in the crankshaft or only through the safety valve.

If after one or two hours of travelling, and while the car is running at a uniform gait, the hand begins to swerve irregularly, slightly at first but soon fitfully, falling to zero and then again rising, the cause is either an obstruction or lack of oil. A glance at the level will tell which.

It happens that the hand drops definitively whatever quantity of oil the pump has to work with, and if the explanation is not to be sought in a poor quality of oil which loses all its viscosity when heated, the reason is either that the safety valve is not held to its seat by its spring and therefore acts as a bypass or that a tube is bursted.

When the hand rises unusually high during normal operation of the car, some impurity must have clogged the circuit, and there is danger of injuring the tubing. One should stop and investigate. Perhaps only the valve has become glued to its seat by reason of too much resin in the oil. In this case, clean the valve with gasoline, empty the oil reservoir and refill it.

Pressure gauges are sometimes blamed for being flighty and unreliable. It is especially charged that the oil tube leading to it is liable to leak. Many owners of cars would in fact like to have the indicator hand of the dial connected by flexible cable to a piston located in the crankcase, rather than by the column of liquid in the tube.

Inaction of the pressure gauge does not always indicate a disturbance in the circulation of the oil, but if a doubt arises because the hand does not move it is always easy to verify the condition. In all motors there is, in some form, a screw or plug closing an entrance to the circulation conduit. Remove it, while the motor is running, and, if the oil gushes out, the circulation is established.

From this enumeration of possible contingencies it is plain that in case of trouble the fault is always to be found either with the filter or with the safety valve. The remedy is obvious: Demand that these organs shall be very accessible. For, all that is required is that they should be cleaned once in a while.—From *Omnia*, April 5.

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FLOATING Wheel-Drive Losing in France.—Whether it be due to improvement in the materials used for wheel shafts, to the increasing popularity of double ball-bearings or to a desire for simpler and more economical construction forms and readier removability of wheels, the number of new models, among automobiles rated as high class, in France in which the driving wheels are supported on the end of the wheel shafts, seems to be increasing. As examples of the trend there are shown in Figs. 5, 6 and 7 the axle-ends in the latest models of Darracq, Vinot-Déguingand and Chenard-Walcker cars. In the latter the drive is effected by a special shaft to a gear ring inside of the brake drum, so that the floating type is out of question—a construction adopted by this conservative firm many years ago and continued despite contrary dictates of the fashions for pleasure cars. The new Darracq model is one fitted with poppet-valve motor, the concern having apparently been compelled to abandon the idea of relying on its rotary-valve motor alone, in view of the disastrous showing of its last annual balance sheet.—Illustrations from *Omnia* and *La Vie Automobile*.

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SUBSTITUTES for Platinum.—Palladium and tantalum have been proposed as substitutes for platinum for electric contacts and terminals, both mainly on the ground of economy. According to C. G. Fink in *Revue Electrique*, tungsten is more acceptable than either, being superior to platinum in all the applications where continued exposure to very high temperatures is involved and costing only about twice as much as nickel in its usual commercial form and about $25 per kilogram when refined to purity. It has been shown that pyrometers equipped with tungsten-molybdenum couples outlasted—so far as the terminals were concerned—those equipped with platinum and platinum-rhodium, and in small electric furnaces for laboratory use tungsten has been used in the form of thin wire for wrapping the porcelain tube and also for the tube itself, in both cases rendering it practicable to generate and maintain a temperature of 1800 degrees C.—From *Electrochemische Zeitschrift*, May.

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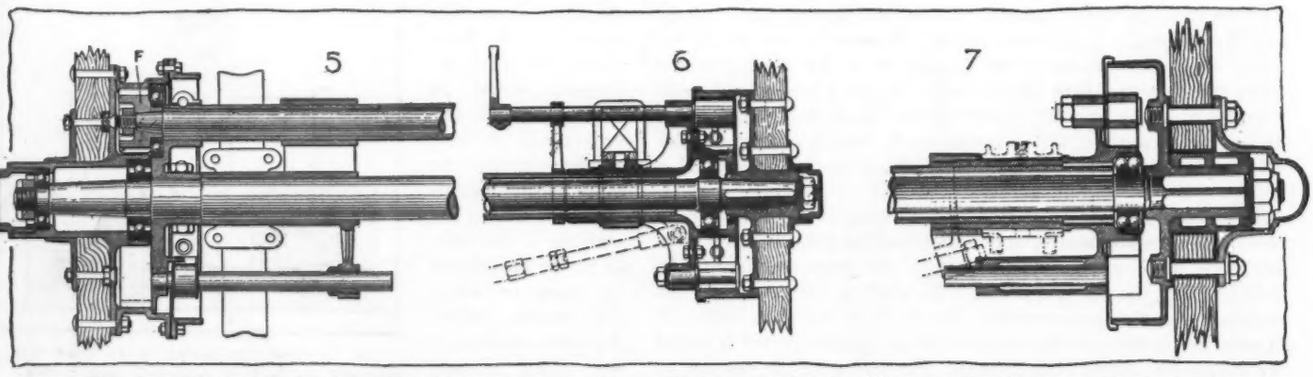
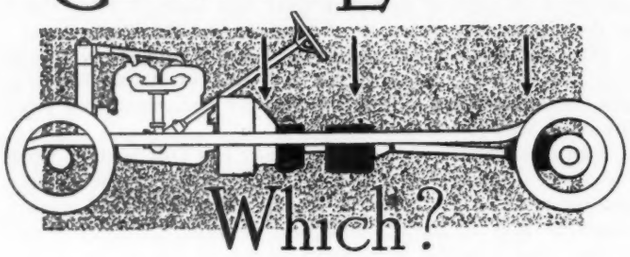
BRONZE Patina for Steel Parts.—After the part has been thoroughly cleaned it is exposed for a few minutes to the action of the vapors of a mixture of HCl and HNO_3 in equal parts, whereafter it is heated toward 300 degrees C. until the bronze-like shade appears. After cooling, the piece is coated lightly with paraffine or vaseline and is then again heated until the fatty matter is decomposed. To deepen the shade, the operation can be repeated. Pretty and unchangeable shades are obtained by this process. By a final exposure to the vapors of *aqua regia* (same mixture as above) a clear brown tint is produced, while a yellow tint can be obtained by adding acetic acid to the original mixture.—From *La Technique Moderne*, May 15.



Figs 5, 6 and 7—Non-floating wheel drives in French Cars—(5) Chenard-Walcker, (6) Vinot-Deguingand, and (7) Darracq

The Engineers' Forum

Gearbox Location



Which?

Part VI.

Another Defense of the Rear Axle as a Gearbox Location

AUTOMOBILE engineers are still manifesting their interest in the question of gearbox location which had its beginning in an article published in THE AUTOMOBILE for April 17. This has been more thoroughly threshed out in these columns by the leading engineers of the country than any other question of design yet brought to the attention of the automobile public. Other topics are also taken up by the engineers in this week's issue of THE AUTOMOBILE, that of the rating of motor horsepower by the manufacturers and by the state registration and taxing officials, and that of tires, whether solid or pneumatic, for light delivery wagons.

Another important question of construction which will be taken up in the Engineers' Forum in the near future is that of automobile springs. Much interest is being taken by both engineers and automobile owners in the article entitled Defects in Springs, which appeared in THE AUTOMOBILE for May 29, and many of them are expressing their views on the subject.

Rear Axle Weight Is Not Important—Bates.

HYDE PARK, MASS.—Editor THE AUTOMOBILE:—After reading the arguments for and against the rear axle gearbox, the only point that seems worthy of consideration is the fact that shifting rods are employed to shift the gears. This should occasion no trouble if the design is carefully worked out in regard to location of centers of oscillation, so as not to cause a pull on shifter rods and levers due to up and down movement of the frame over rough roads.

In regard to extra unsprung weight on the rear tires, there may be a basis for argument on this point, but it seems to be more theoretical than practical, as we have proven by test that our rear axle gearset, torque tube, etc., weighs 54 pounds more than another rear axle of very popular make used on our type of car. If the rear axle weight is such an important consideration, we all should go back to the propeller shaft brakes, cut down the size of the rear wheel brakes, and save every possible ounce, but in practice, our cars of 3,200 pounds with 4-inch tires show an average mileage of 4,500 to 5,000 miles, and quite a number from 6,000 to 7,000 miles, while with 4.5-inch tires, our owners have run, in a number of cases, from 8,000 to 10,000 miles, so that it seems that this point is more theoretical than practical.

Now in regard to the argument that the rear axle gearset is cheaper for the manufacturer. Certainly what is cheaper in the way of simplicity for the manufacturer should be to the advantage of the buyer. If it costs less to manufacture and assemble, certainly when the tire comes for repairs and adjustment, and the time will certainly come, this point must work to the advantage of the owner, as it is a matter only of releasing torque tube ball housing, spring seats, and brake rods, in case the transmission is to come out, and the whole job is ready to do whatever is necessary, a matter of perhaps half an hour's work.

In regard to accessibility for inspection, we find that it is no more difficult to remove tonneau floor boards than the floor boards in front.

In regard to poor weight distribution, we find that our touring cars weigh 20 pounds more on the rear end than the front, so there cannot be any great argument there, while the center of gravity of our transmission is 4 inches lower than with the amidship or motor unit construction, which is certainly a point in our favor.

Then in regard to noise, everybody will admit without argument that the rear axle type is superior to other types in this respect.

In regard to poor riding, this point seems to be more a matter of spring suspension than anything else, as I have seen very good and very bad riding cars of all constructions, and have seen cars of rear axle transmission type ride as well as cars of the other types.

In regard to multiplicity of parts, the rear axle unit has, especially in our construction, no parts such as radius rods, torsion rods, extra universals, etc., to become loose and rattle, such as are ordinarily found in amidship construction, which of course means less wear and tear on the nerves of the owner, and his pocketbook.

In the matter of alignment, this point requires no argument whatever, as the advantage is altogether with the rear axle and motor unit type.

In regard to its being fit for use only on cars of low horsepower, we all remember this same argument upon the advent of the shaft drive; time has proven this construction suitable for any horsepower.

To the mind of the writer, there seems to be no good argument for the amidship transmission, the question in mind being whether the motor unit is better than the rear axle unit, and we have come to the conclusion that it should be the latter.—C. T. BATES, Engineer, Lenox Motor Car Co., Inc.

Thinks All Types Satisfactory—Macksey.

EAST ORANGE, N. J.—Editor THE AUTOMOBILE:—In discussions recently published in THE AUTOMOBILE I have noticed that each location of the gearbox had its good and bad points equally distributed. I noticed that one manufacturer claims that the placing of the gearbox amidships will distribute the weight more evenly so that an undue proportion is not put on the front axle or on the rear axle, to some extent lessening the liability of skidding, while another says that the gearbox placed on the rear axle will give the rear tires more traction, also lessening skidding. Then, too, the unit with the motor has its advantage in that it is most simple and easily accessible. Most of the engineers agree that the weight of the car has a great deal to do with the placing of the gearbox, that the unit with the motor belongs to the small cars, there being less weight; that the gearset mounted amidship should be in a high-powered car; and the gearset as a unit with the rear axle should be used where quietness of operation is wanted and a wide range of choice for the engineer in the location of his control levers which may be set practically anywhere

to conform to his particular idea of accessibility with this type of gearbox.—JAMES F. MACKSEY.

Automobiles Pay Enough Taxes Now—Klinger.

DAYTON, O.—Editor THE AUTOMOBILE:—I certainly believe the tendency within the last few years of all manufacturers has been to rate their motors under absolutely ideal block conditions. The motors, it is true, will show considerably greater horsepower under these conditions than they will when actually applied to a chassis and operated on the road. As a matter of fact, it is very seldom that the full horsepower of the engine which it is capable of producing in the chassis is utilized in road service, and our impression is that fully 95 per cent. of the time motors are operated only at from 15 per cent. to 20 per cent. of their rated capacity, and we further believe that there is a tendency in all automobile plants toward a reduction instead of a further increase in the size of motors.

I should very much regret to see any action taken which would increase the tax levy of various states on the automobile, not for its influence directly on the trade, but as a matter of justice, as the average automobile owner certainly contributes his share to the various state expenses.—P. W. KLINGER, Speedwell Motor Car Co.

S. A. E. Rating Is Accurate Enough—Feilcke.

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—We agree with you that the present S. A. E. or A. L. A. M. horsepower rating is accurate enough to be taken as a basis for taxation purposes.—KARL FEILCKE.—Motor Car Mfg. Co.

A Consistent Motor Rating Needed—Power.

SYRACUSE, N. Y.—Editor THE AUTOMOBILE:—The formula for horsepower of motors other than the present S. A. E. rating should have a value by which a comparison of different motors can be made, and also furnish a basis of taxation.

The varying bores and strokes, together with other factors, such as valve design, balance, weight of reciprocating mass, etc., have a major influence upon the horsepower. If there is to be any consistency in motor rating, it should be based upon the volumetric displacement of the pistons and a piston speed in excess of 1,000 feet per minute. This would give all reputable manufacturers, who are exercising their skill toward the production of a motor of higher horsepower for the same or less weight, of higher fuel economy and of staying qualities, a deservable higher rating—as it obtains today.

Our 4 1-2-inch by 5-inch motor develops 12 per cent. more power at 1,000 feet per minute piston speed than the S. A. E. rating, while the maximum horsepower is developed at a piston speed of over 1,600 feet per minute.—M. POWER, Engineer, H. A. Moyer.

S. A. E. Formula Is Satisfactory—Lambert.

ANDERSON, IND.—Editor THE AUTOMOBILE:—I am of the opinion that the A. L. A. M. rating is nearer right than any other rule for figuring horsepower of motors.—J. W. LAMBERT, Buckeye Mfg. Co.

Pneumatics Best for Delivery Work—Stewart

BUFFALO, N. Y.—Editor THE AUTOMOBILE:—One of the most important problems that confronts the designer of light delivery trucks is the question of pneumatic tires or solid tires. In an effort to eliminate tire troubles some designers of light weight delivery cars have adopted the obvious expedient of using solid tires. Without exception the results have been most unsatisfactory.

Even where spring wheels of various types have been adopted the use of solid tires has proven a serious mistake.

There are three chief disadvantages to the solid tire for use on light delivery cars—first, vibration; second, tire wear; third, increased gasoline consumption. The light weight delivery car must necessarily be operated at a speed of from 20 to 25 miles an hour in order to accomplish the work for which it is designed. At this speed, no matter how well the car is designed, the constant jarring of delivery service will very soon result in mechanical trouble. This simply cannot be avoided.

Some designers make the mistake of building their truck parts several times heavier than necessary, thinking thereby to make it possible to use solid tires. This, however, is a fallacy, for the excess weight they add causes additional strain.

The second disadvantage is that a solid tire will heat up and deteriorate rapidly if the speed exceeds 18 miles an hour. I do not believe there is a tire company in America that will give a guarantee on solid or cushion tires if they know that the speed of the vehicle will exceed 18 or 20 miles an hour at any time.

The third disadvantage is increased fuel consumption. From our past experimental work we feel safe in stating that the gasoline consumption will be 25 to 30 per cent. more with solid tires than with pneumatic.

With demountable rims the truck user has little to fear from the chance of punctures. A tire can be replaced in a few minutes and the truck is then again in service. But mechanical trouble resulting from the use of solid tires requires hours for repair during which time the car is out of service—to say nothing of the expense of mechanical repairs.

Experienced truck users have learned the fallacy of the solid tires. John Wanamaker has been using motor trucks probably longer than any concern in America. At first Wanamaker demanded solid tires; now he will not buy a delivery rig with anything bue pneumatic tires. He has learned by experience.

The New York *Herald* some years ago bought several Renault trucks. When the first pneumatic tires wore out they replaced them with solid tires. From that time on records show that the trucks were in the repair shop a considerable part of the time. Noting this, the *Herald* people finally replaced the solid tires with pneumatic and at once the trucks resumed their former satisfactory service.

All this is true of every other concern that has had experience with motor delivery wagons. The little bit saved in tires is spent three or four times over in mechanical upkeep.

In my opinion it will be only a year or so till all prudent buyers of light delivery trucks will demand pneumatic tires for their own protection. I should be glad to hear the opinion of other engineers on this important subject.—R. G. STEWART, vice-president and chief engineer, Stewart Motor Corporation.

Make Accessibility Indispensable—Day.

BINGHAMTON, N. Y.—Editor THE AUTOMOBILE:—Although I am not an automobile engineer, I have owned and driven cars of various makes and models for several years and one point has always struck me very forcibly. This is the secondary consideration given by many engineers to the important feature of accessibility and demountability of parts.

With a large number of the cars now on the market, and particularly with the smaller types of cars, when one has trouble with the motor or its adjustments, the suspension, the cooling system, the gearbox or transmission line, or, in fact, almost any part of the car whatever, he has to dig around in the most inaccessible places possible to imagine and generally with a disastrous effect on his clothes. His temper, of course, is usually affected, too, and sometimes his language.

It seems to me that, while the leading engineers are trying to make accessibility a salient selling feature of their cars, they do not go into the matter thoroughly enough to get real results. They had apparently made considerable headway last year when suddenly the electric starting and lighting stampede began and threw most of them off their mental balance, from the mechanical mix-ups into which they converted their motors, so recently worked up into clean designs. Since that time most of them have been trying to recover the lost ground, with varying success.

In my opinion, the only element required to bring about a much more considerate style of design by the engineers is the pressure of public opinion to the effect that accessibility is indispensable in a car. I would like to see some of the engineers' views on this subject published in The Engineers' Forum.—LEE DAY.

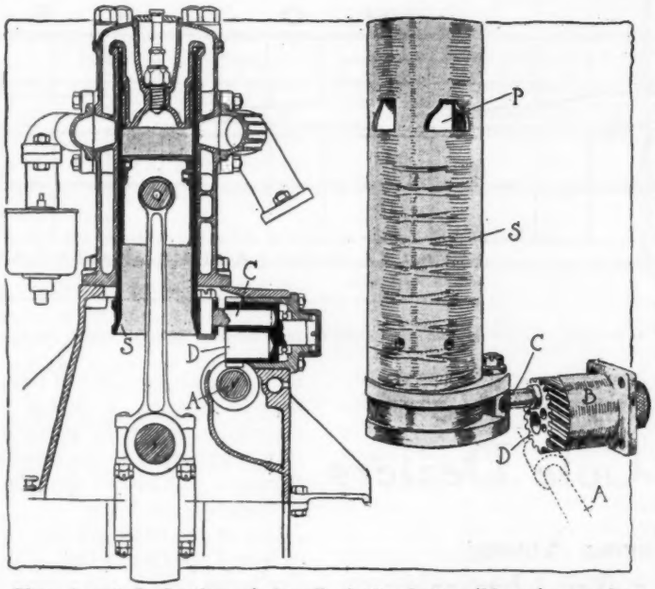
Sleeve-valve Car Makes 14-hour Record

LONDON, ENG.—A remarkable track performance of great interest to automobile engineers in general and non-poppet enthusiasts in particular has recently been made at Brooklands, in which a car with a sleeve-valve engine succeeded in covering 1,016 miles 437 yards in 14 hours at an average speed of 72.52 miles per hour, constituting a new world's record for that time. The triumphant car is an Argyll, a popular British make, and one of the most successful exponents of the single-sleeve school of slide-valve operation.

The record for 14 hours which has been struck off by this latest performance is an old standing one of 6 years by S. F. Edge, who made 980 miles 480 yards on a Napier in 1907.

Much of the value and importance of the test is owing to the fact that it is the first officially observed track trial of any appreciable length of a slide-valve engine, although bench tests and road races in which another type of slide valve has participated have demonstrated the practical value of the double sleeve valve.

The Argyll chassis used was of the standard type as sold on the market, with the exception of two minor alterations which, however, do not detract in any way from the lessons to be learned from the trial. These were the lightening of some of the reciprocating parts and the substitution of a gear ratio more suited to performance on the track for that on the standard model. The engine dimensions are 3.5 inches stroke by 5.12 inches stroke. A Zenith carbureter was used and Bosch ignition. The final drive at the rear axle is by overhead worm, the gear ratio for this test being 3.25 to 1. The body was a single seater of streamline form with a pointed tail, and the total weight 2,726 pounds.



Figs. 1 and 2—Section of Argyll single-sleeve slide-valve engine with detail view, showing sleeve and operating mechanism

No engine trouble of any kind developed during the run, the only stops throughout the entire 14 hours being either for the replacement of tires or the changing of drivers. The wheel was taken alternately in 3-hour shifts by W. G. Scott, works manager of the Argyll factory in Scotland, and L. G. Hornsted, a well-known racing driver.

A remarkable feature of the trial was the regularity of the speed, which was maintained at between 72 and 73 miles per hour throughout the whole performance. The lowest speed took place during the fourth hour, when a distance of 72.04 miles was covered. This speed was well within the power capabilities of the car. The arrangements for the event were very complete and well thought out. At every lap the driver was informed by means of large figures on a board the speed of his previous lap so that he was able to gauge his driving accordingly. Further, there was a system of signals to denote whether the exhaust was smoking or not so as to facilitate the lubrication problem for the driver. A staff of well-trained men were stationed at the replenishment depot and an idea of their speed, even in these days of red-hot work in the tire pits during the big races, can be gathered from the fact that in one of the stops, which was timed to last only 1 minute 41 seconds, all four wheels were changed, gasoline and oil tanks filled, the engine crankcase drained and refilled, and the car restarted. Castor oil was the lubricant used for the rear axle, the casing being kept always filled. At the end of the run the worm gear casing was found to be no warmer than would be the case with bevel gear.

A brief description of the Argyll sleeve valve may be of interest. Fig. 1 shows a transverse section in which the sleeve S will be noted, occupying the annular space between the piston and the cylinder wall. Its action is peculiar in that the motion imparted to it is not merely up and down but is also partly rotational. This will be made clear by reference to Fig. 2, which shows the sleeve and its operating mechanism detached from the engine. The reciprocation of the sleeve is effected by the action of a small crank C which has a sliding fit in the rotating member D. This latter is carried in the bearing B, which is bolted to the crank casing wall. The operating shaft A, which is equivalent to and occupies the same position as the camshaft in the poppet-valve type of engine, is provided with four worms or skew gears, one at each cylinder, which engage with teeth on the rotating member D, driving it at half the speed of the crankshaft. This reduction takes place at the skew gearing, the camshaft itself running at the same speed as the engine shaft by silent chain.

Two revolutions of the engine shaft, therefore, cause a single revolution of the actuating crank C, which in turn imparts such a motion to the sleeve that any one point on its outer surface will have traveled through an elliptical path on the cylinder wall.

This peculiar motion is the fundamental principle of the Argyll valve. It permits a complete register of opening of the valve port P with the corresponding ports in the cylinder wall while the sleeve is traveling in one direction and a complete closing on the opposite stroke. As the sleeve descends, exhaust is opened and during the return stroke the inlet ports open. This cannot be accomplished by a single up and down stroke of a sleeve with the ordinary straight reciprocating motion, where both valves would necessarily be opened twice.

The method of final drive renders the result doubly interesting, for the amount of information regarding the efficiency of worm drive as against bevel is scanty and difficult to obtain. In any case no better way of bringing forcibly to mind the practicality of the worm drive as a means of transmitting the power of the engine to the road wheels could be devised than this establishment of a record in which the worm played a part.

In the Argyll cars the drive is practically in a horizontal straight line from the engine to the rear axle, the worm being located over the worm wheel. The high efficiency of this type of drive with its almost total elimination of work wasted at the universals is generally recognized.

The designer of the Argyll car is a Frenchman, M. Perrot, and it was first introduced to the automobile public at the Olympia exhibition in London at the latter end of 1911.

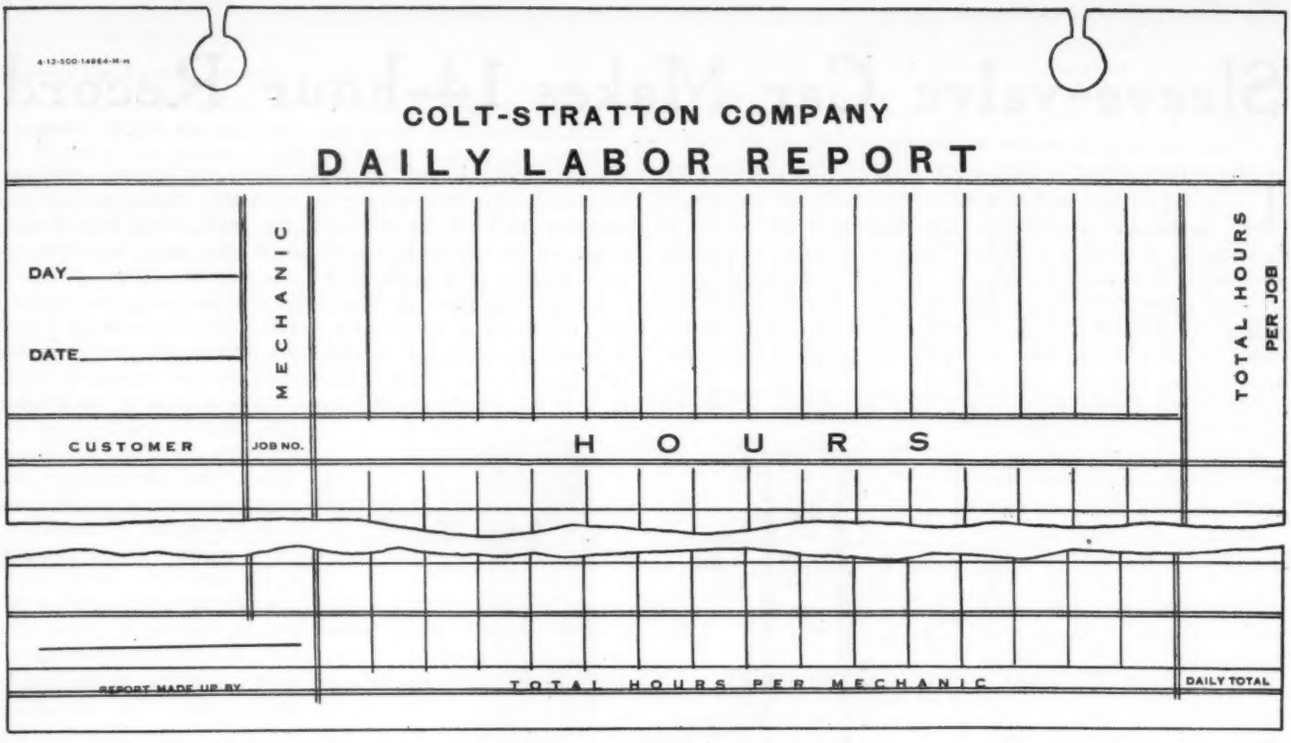


Fig. 1—Daily labor summary, which shows the distribution of the skilled labor used on various job orders

Service System of New York Cole Dealers

Including Twenty Forms Among Which a Number Are Original—Daily Labor Report a Feature

IMPROVEMENT of car construction is only half of the developments made by the industry. The other half consists in the evolution of the means for prolonging the life of the car and increasing serviceability, which means are numerous and of varying efficacy. Among them good roads and prompt, efficient service are of leading importance. To use an illustration, let us compare an automobile to a set of teeth which is gradually depreciated by its work until it is all worn out. If the comparison is carried further, good roads correspond to the proper food which is mechanically and chemically least harmful to the teeth—the automobile; while the prompt attention of the decaying teeth, by means of which they may be saved and their life and service prolonged, finds a parallel in repair work made while the troubles growing in the car are still in their incipient stage. This simple comparison makes it clear that prompt service is a great advantage and necessarily appreciated by the user of a car, and that on this account it is the duty of the manufacturer toward himself and his customer to conduct his service departments as efficiently and economically as he can, which can only be done if all details of the organization are known to the heads thereof.

Complete service systems for automobile agencies and branches are now becoming an everyday thing and, although most of the systems are quite similar in general ways they differ in more than one particular. The latter fact is caused by the differences in experiences of the men who design the system and the blanks used in connection with it and as a further consequence there is hardly a system which does not include several original blanks, or, if they are not original throughout, such that are new in more than one respect. By this is meant that a given form is either designed in a specially advantageous way to serve its purpose or that it provides for the recording of additional information as compared with blanks used for the same purpose up to the time of designing the blank.

One of the latest service systems which have been introduced in New York City is that of the Colt-Stratton Co., Cole dealers. The forms used in this system are here described and illustrated and the readers interested will find, by comparing these forms with systems already described in THE AUTOMOBILE, that the Cole

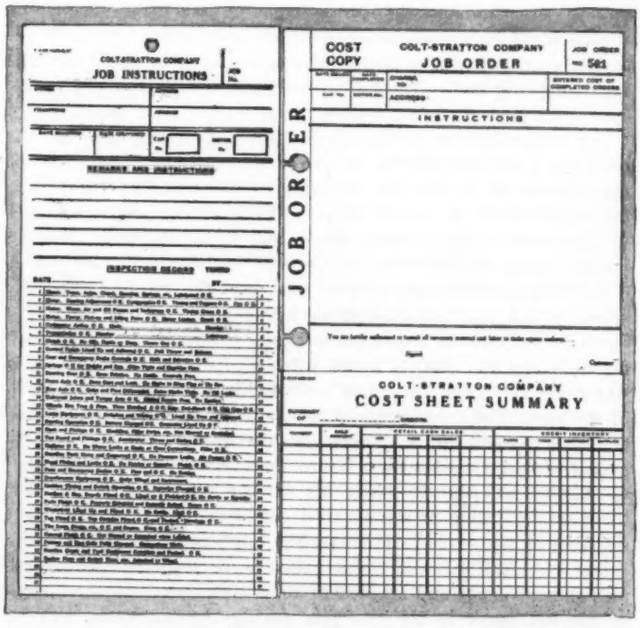


Fig. 2—Instruction tag attached to car. Fig. 3—Job order form. Fig. 4—Orders summary sheet

NAME

ADDRESS

	DISPOSITION					DESCRIPTION						
	Date of Claim	Credit Memo No.	Date of Credit	Stock Room Credit No.	Claim Dept Credit No.	Date	Car No	Motor No.	Quant	Catalog No	Article	Claim No.

6-23 SM 15280 MH

COLT-STRATTON CO.

JOB LABOR TICKET

No._____

MECHANIC_____

STRAIGHT TIME STARTED

JOB NO. | CHARGE TO_____

DESCRIPTION OF WORK

TIME	RATE PER HR.	AMOUNT	FINISHED
____	¢	$ 100	

Fig. 5—Record of material received from customers and dealers.
Fig. 6—Job-time record card

scheme is original in many ways and therefore worth describing.

1. Job Order—The first form, Fig. 3, is 8.5 by 11 inches, one copy being printed on yellow paper and one on white, the yellow copy being marked charge copy and the other cost copy. Both are numbered with the same number, coming in pads which form series. The order is made out in duplicate, that is to say, on both forms when the customer brings in the car. He signs the order for the cars turned over to the shop.

2. Job Instruction Tag—Fig. 2 shows the tag used for giving the shop men instructions of the work to be done on the car, for inspecting the same after repairs are completed and for checking the equipment and accessories on the car when it is taken over and before it is delivered. The accessory checking spaces are printed on the reverse of the form, not shown here. The tag, as here illustrated, is 6.5 by 14 inches, printed black on yellow cardboard and fitted with eyelet for the purpose of attaching the card to the steering wheel of the automobile. The upper half of the side here shown is filled out in the office of the department superintendent before the car and the tag go into the shop, while the accessory checking space is first filled out when the car is taken over by the shop and the removable parts are taken off and placed in the locker, marked with the car owner's name and the number of the automobile.

3. Job Labor Ticket—The Colt-Stratton Co. uses square labels on thin paper for recording time spent by a man at any given job, this ticket being supplementary to the weekly clock card. Fig. 6 shows the job ticket used during day time, which has spaces for the number and name of the workman, the job number, the party to whom the work is to be charged, the description of the work, time consumed, the wage rate, the total wages due for the work and the time of starting and finishing the job. This ticket is white; if overtime work is done a pink ticket is used which is printed exactly like the white, save for the words overtime in place of straight time. These tickets are turned over to the shop foreman in the evening when the workman leaves the place, being delivered by him to the office, where the payroll is made up.

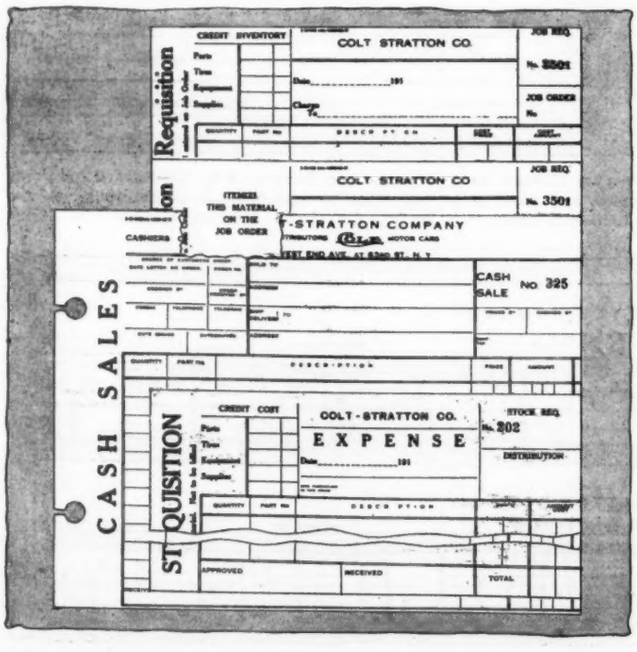


Fig. 7—Requisition on job orders. Fig. 8—Cash sales requisition.
Fig. 9—Non-job requisition

4. Daily Labor Report—The times spent by the workmen on the various jobs during a day are compiled and recorded on the daily report, Fig. 1, which is printed on tan paper, 10.5 by 14 inches, the names of the various workers are entered adjacent to each other at the top portion of the sheet, while the names of the customers are given in the first column of the paper. The spaces formed by the intersection of the horizontal and vertical columns are filled out with the time spent by the mechanic on the car of the customer. The last column at the right of the sheet gives the total amount of time spent on the various jobs, while the last line at the bottom contains the total hours spent by each workman. The clerk who makes up this report from the time tickets sign it before turning it over to the book-keeper.

5. Job Order Requisition—Whenever material is needed in the shop for the execution of repair work, the man requiring the material fills out a requisition, Fig. 7, which is 9 by 6 inches, and comes with a duplicate bearing the same number. The original is white and the upper left corner is printed with a space marked credit inventory on which material to be credited to the customer are recorded. In filling out this form the workmen dates it, fills in the name of the car owner, the number of the job order and particulars referring to the material that he needs. Before the latter is drawn from the stockroom the foreman O. K.s the requisition and its yellow duplicate, both being taken to the stockroom, where they are retained after the material has been given out and signed for on the two copies by the person receiving it. At the end of the day the white copy is sent into the office, while the yellow remains with the stockroom foreman to be filed.

6. Expense Stock Requisition—Fig. 9 shows a requisition

which is used when material is drawn from the stockroom required for any purpose except a job order. This form is of the same size as Figs. 7 and 8, but is printed on green paper and comes in pads, blanks being consecutively numbered.

7. **Cash Sales Record**—If parts are bought from the Colt-Stratton Co. a special requisition is made out, Fig. 8, which is 11 by 8.5 inches. The original is printed on white paper and is destined for the cashier; a pink duplicate is delivered to the customer when the order is taken; a yellow triplicate goes to the service department office and the quadruplicate, printed on light tan cardboard, goes to the stockroom where it is filed after the goods have been given out. As Fig. 8 shows, this blank affords space for recording a mass of valuable information.

8. **Bill**—Fig. 12, bill used by the Cole dealers in New York City, the duplicate differing only by the distribution space printed in the upper left corner. This space is used to give a comprehensive statement of the distribution of the amount appearing on the bill and what they are for. By striking out the W and R mark, a record is made of whether the goods were sold retail or wholesale. In all other respects this bill is designed along strictly conventional lines. Originals and duplicates are numbered.

9. **Defective Parts Return Record**—When defective parts are returned to the company the office clerk receiving them fills out a record, Fig. 14, which is printed red on white paper, with a duplicate on pink and a triplicate on yellow paper. The original copy is kept by the accounting department, the duplicate is given to the customer or his representative delivering the parts, and the triplicate accompanies the latter to the stockroom. The claim department, which receives the goods when they are brought in, puts down all the data referring to the car on which the parts were used and makes out a credit note to the customer which is numbered, the number being recorded on the form, Fig. 14.

10. **Return to Stock Form**—If new parts or materials drawn from the stockroom for the purpose of a repair job are returned to it without having been used, a form, Fig. 13, which is of the same size as Fig. 14, is made out. The original is printed on white paper and the duplicate on yellow, being filed by the accounting department and the stockroom respectively. This form is also used if parts have been sold to a customer and are returned without having been used. In any case, the date on which the parts were issued and the order on which this was done as well as particulars referring to the party to receive them and to the nature and quantity of the material are recorded on this form. The stockroom clerk signs both copies of the form before the material is put back in the stock.

11. **Credit Memorandum**—Whenever a customer returns parts he is given the credit referred to above, which is illustrated in Fig. 15. The copy given to the customer, however, is printed with the name of the company on top of the paper and is 9.25 by 8.5 inches, while a duplicate, here illustrated, is 11 by 8.5 inches. Both copies, however, are printed on pink paper. The copy here shown is filed by the claim department, which latter takes the matter up with the factory.

12. **Cost Sheet Summary**—It is of special value to the company to have a particular record form for compiling every day the cash sales made and the credits given for return parts. Fig. 4 shows this blank, which is 11 by 8.5 inches, printed on white paper and punched so that it may be held in the binder together with records made in the past. On this form the number of order or the credit memorandum is entered and along with it the amount of the same as well as the distribution of the money on the repair work, tires, parts; or, in the case of a credit memorandum, for what the credit has been extended and how much of it goes to tires, equipment, etc.

13. **Material Received Record**—All material which is received by the company and which has been sold before is recorded on a special form, kept in a binder. This form is shown in Fig. 5, being 11 by 12 inches. It is printed on both sides. The date when it was received, the party by whom it was sent, the number of the credit memorandum, etc., as well as particulars referring to the part itself are entered in detail. The form is large enough to afford space for forty entries on one side.

14. **Claim Sheet**—All parts which have been returned to the Colt-Stratton Co. are sent by it to the Cole factory in Indianapolis with a claim sheet, Fig. 17. It is 8.5 by 11 inches, printed on yellow paper, and is filled out with a complete list of the material sent to the factory. The number of the article, the

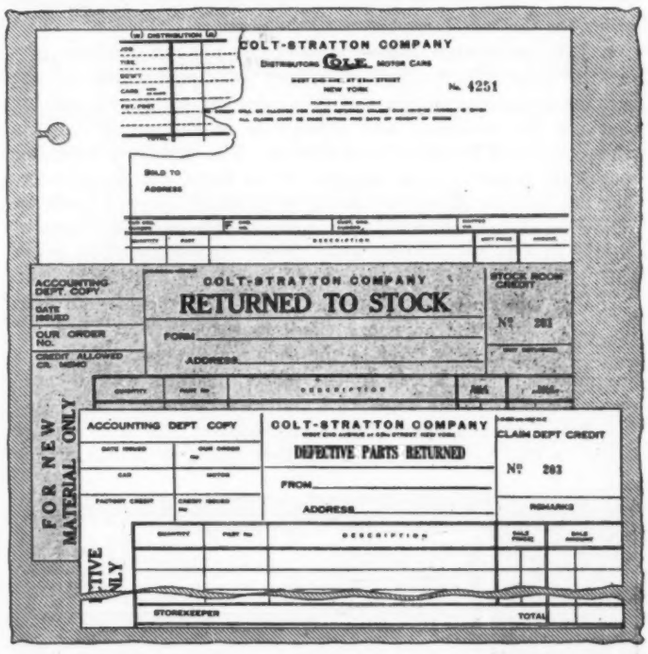


Fig. 12—Bill form used by Cole dealers. Fig. 13—Record for parts sold and then returned. Fig. 14—Record for defective parts returned to stock

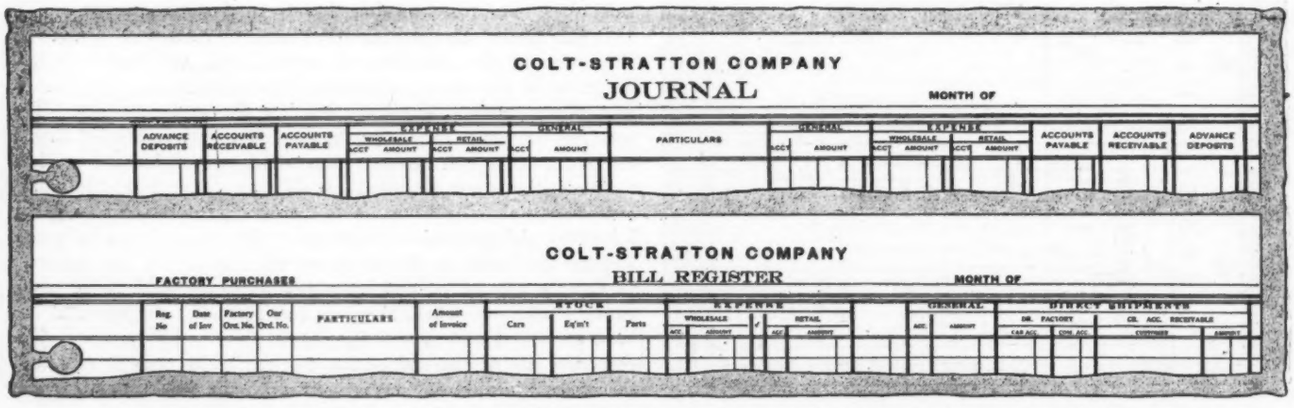


Fig. 10—Top of page from the Colt-Stratton Co.'s journal. Fig. 11—Design of bill register page used by the company

quantity, the car from which it was taken and the description of the article are stated on this sheet, which is signed by the manager of the claim department or technical department before the parts and the sheets are sent to Indianapolis.

15. Shipping Order—All materials leaving the service department are accompanied by shipping orders, Fig. 16, which are made out in quadruplicate. The original (white) goes to the accounting department, the duplicate (pink) is packed with the goods, the triplicate is filed in the main office of the service department and the quadruplicate remains with the stockroom, where the order is made out. The form is 11 by 8.9 inches, and every single detail referring to the transaction which results in the shipment is recorded on the order.

16. Bookkeeping Forms—Bookkeeping operations are carried out on four forms, which are held in four distinct binders. Fig. 18 shows the form used for recording the influx of money; the blank is designed more or less along lines of ordinary ledger leaves except what specific provisions are necessitated by the singular conditions of the automobile business. Each line has space for taking the name of the payer, date of payment, the amount of cash received, money deposited and where, discounts granted to the company, deposits made on transactions, cash come in on retail sales and the total amount for that cash receipt. Fig. 19 shows the cash disbursement sheet, designed similarly to Fig. 19, but adapted to the opposite purpose. It affords space for the date, the name of a payee, the number of the check issued him if the payment was made by check, the amount of cash paid to him if any, the name of the bank on which the check was drawn, discounts paid, retail and wholesale expenses, petty expenses and total of the payment.

Fig. 10 illustrates the company's journal, the sheet being designed quite conventionally. Fig. 11 shows the bill register, on which every bill sent out and the details appertaining to the goods for which it is sent are recorded.

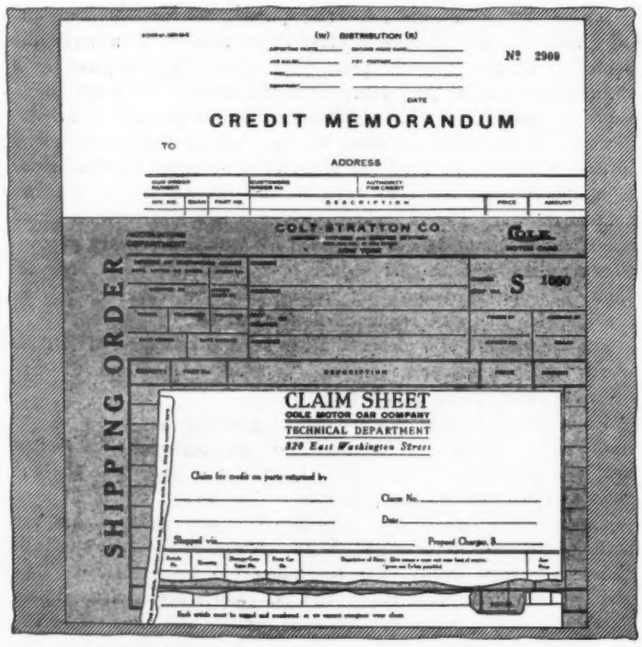


Fig. 15—Credit memorandum for returned and defective parts.
Fig. 16—Shipping order used for recording outgoing materials.
Fig. 17—Claim sheet

City Electrics Have Advantages

Few people who are desirous of owning an automobile are aware of certain advantages of the electric car for city and near-city service. Silence, cleanliness, and ease of control are features which are seldom reckoned with as worth money; but there is a distinct feature of economy about an electric. The following figures bear this out.

In New York City an electric is garaged, charged, cleaned and generally cared for by any of a number of garages for $40 a month; not forgetting delivery at the owner's house and calling for the car, both once a day. In other words, for $40 a month, or $480 a year, all expenses except car depreciation and tire cost are taken care of. Figuring a set of four tires, guaranteed to last for 10,000 miles, at $280, the cost of operating an electric automobile per year is as follows:

Depreciation (25 per cent. of $2,300)	$575
Garage, current, etc.	480
Tires (27.39 miles on each of 365 days)	280
Repairs, accessories, etc. (high estimate)	100
Total	$1,435
Operating cost per day	$3.94
Operating cost per mile	.143
Operating cost per day per caput (4 persons)	1.31

For less than $4 a day the car can be made to travel over more than 27 miles every day in the year. This means that it will take the owner to business; having been sent back by a clerk or the like; it will serve to take miladi to her places of shopping, and it will furnish a means for both and perhaps a child to get a sniff of fresh air after the hours of business. The cost to each of the three members of the family will be $1.31 a day. But the car will do more than that. If the owner is a doctor or lawyer, it may be necessary to use the electric more than 27 miles a day at a slightly higher cost, on account of the additional current needed; but the ownership and use of a car will result in direct gain of business, as everybody rather deals with a successful physician or attorney—that is, one who can afford such modern equipment as an automobile—than with one who cannot.

There are districts, such as Westchester County in New York State, where a car owner can draw any amount of current for his car at the cost of $10 a month, and such a condition, of course, makes the ownership of an electric still easier and more pleasant. As the radius of action is from 50 to 80 miles on a charge, a nice trip may be taken any day without having to stop during the day for recharging.

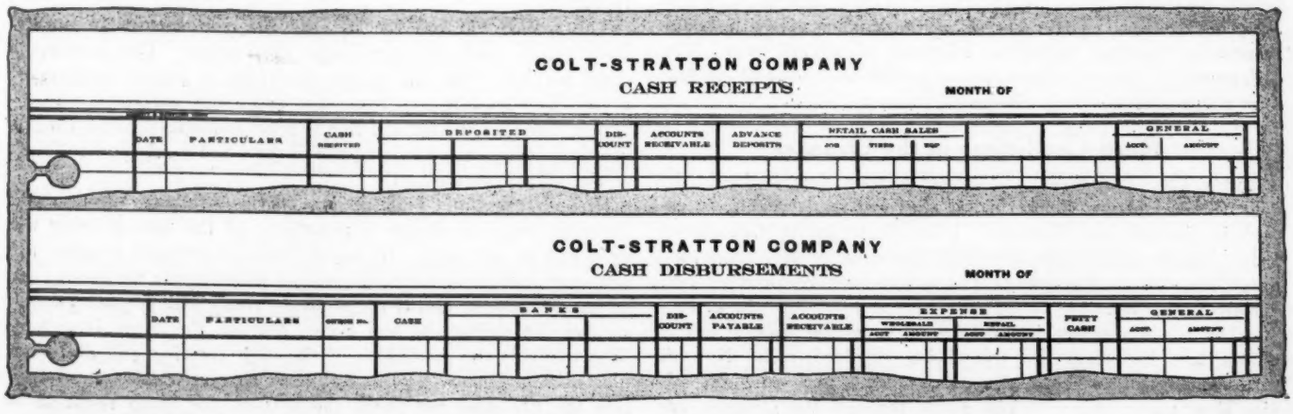


Fig. 18—Head of page used in company's cash-receipts book. Fig. 19—Record blank for cash disbursements made by company.

The Rostrum

In which Letters from Readers Are Answered and Discussed

Owner Uncertain as to Use of Cut-Out

Wants to Know if He will Increase Power by Using One—Another Seeks Road Information—Spring Wheels Advocated—Using Carbon Remover—Cleaning Carbureter with Air Blast—Locating and Remedying Plug Trouble

Effect of the Cut-Out on Power

EDITOR THE AUTOMOBILE:—I am preparing to go on a long tour this summer and would like to know whether I would develop more power if I use a muffler cut-out.

East Orange, N. J. F. E. S.

—Several tests were made on a car at the laboratory of a prominent factory in Detroit, Mich., in order to determine the actual loss of power developed by the attachment of the muffler. The tests showed that the difference in power developed with the muffler on and with the cut-out open was very small. Tests were made by the Packard Motor Car Co. at its Detroit, Mich., laboratory with a 30-horsepower motor without a cut-out, the muffler being merely removed from the line. In this way a higher horsepower is developed than without a cut-out, as shown in the curves, Fig. 1. The results of the test are given in the following table:

Revolution per min.	Horsepower with muffler attached	Horsepower without muffler	Horsepower difference—Less	Horsepower difference—Greater	Corresponding speed miles per hr.
500	23.7	21.5	—2.2	...	17
600	27.8	26.2	—1.6	...	20
700	31.7	31.2	—0.5	...	23
800	33.8	36.0	.....	.2	27
900	38.9	40.0	.....	1.1	30
1,000	41.6	43.0	.....	1.4	33
1,100	44.2	45.6	.....	1.3	37
1,200	46.6	48.2	.....	1.6	40
1,300	48.1	51.0	.....	2.9	43
1,400	49.2	53.4	.....	4.2	47
1,500	50.7	54.7	.....	4.0	50
Total Ave.....		41.0		1.13	

From this table it can be seen that the average difference in power gained by removing the muffler varies between 2.75 and 1.125 horsepower. The removal of the muffler gives the same results as a cut-out having an efficiency of 100 per cent. The differences in power caused by using the cut-out will be less than those shown in the tabulation.

Road Conditions in the Oranges

Editor THE AUTOMOBILE:—I expect to tour New Jersey in the near future and would like to know of the road conditions, especially through the Oranges. I expect to go to Greenwood Lake, and have heard that the roads were not in very good condition last fall to that place. Have they been repaired as yet?

New York City. S. E. F.

—The roads are now in fairly good condition, though a few of the less important are now being repaired. The Newark turnpike is not in as good shape as reported, and we would advise slow going over it. The roads through the Oranges are especially excellent, as are those up to Greenwood Lake.

Says Spring Wheels Cure Bumps

Editor THE AUTOMOBILE:—The pneumatic tire, inflated and on a smooth road, is almost ideal in its action. It absorbs the pebble or throws it to the side. But a tack, jagged glass, or a sharp-pointed stone projecting from the surface of a rut interrupts its usefulness. The dust caused by its passage is an imposition on the residents along the way amounting almost to an injury. On a rough road the rebound is so rapid that the rider is bounced from the seat even to the destruction of his hat against the top. The thoughtful driver is never care-free. Hard work, expense and danger follow in his wake. Ordinary precaution requires that he carry spare parts and that he remedy all faults as soon as discovered. Many times he leaves his car at the roadside to await repair-parts far away.

The automobile is a pleasure-giver beyond compare. If life is worth living it is worth keeping. Question: How can the tire be made safer, more dependable?

The solution may be approached by studying the bump in extreme cases. Bumps, for the most part, are caused by the violent dropping or lifting of the car. Usually the drop and the lift follow each other in one sequence or the other.

The moment before the drop the tire and body spring are both compressed by the load. At the instant of the drop the load is released from both. The tire comes to normal form. The springs, coming normal, throw the axle and wheel swiftly down. When the impact comes the loosened springs and clips rattle, the load meantime falls and its momentum is finally stopped by the joint compression of the tire and springs. This compression is greater than the amount required to carry the load and hence the rebound.

The moment before the lift the tire and springs in normal compression meet a perpendicular obstruction. This presents a small surface to the tire which, therefore, is greatly compressed at one spot so that sometimes the two inner surfaces come together. For an instant the tire is solid noticeably. The springs are again compressed beyond the normal and a rebound follows; at the proper time a rattle.

In both cases the load reciprocates in gradually diminishing traverses until its energy is absorbed. If the time between the drop and the lift or the lift and the drop is sufficient to allow the tires and springs to return to normal compression the bumps are of bearable class. But if the sequence either way is quick enough so that the spring and tire cycles overlap, the bump is violent. This explains the deadliness of the high crossing and the small hole in a pavement. If this last is of correct width and so deep that the tire does not touch the bottom, the bump resulting is the king of bumps.

The cycle of the passenger is always a little behind that of the car. The seat is started up before he stops going down—bump—and the lag of the wheels and the axle caused by the relaxation of the springs does not affect his course. He leaves the seat and on the return falls against the seat, then rapidly rising—bump.

Now what can be done for him?

It is necessary to have something under him to check his course to the blow. So cushion-springs, body-springs and pneumatic tires are provided for this purpose. The greater the distance through which he is checked before he is stopped the less the blow. Anything which curtails the compression of the springs is a positive detriment to him. If the springs and tires could slowly return to normal compression to be ready for the next call for their services the bump would be almost eliminated.

In the case of the springs this can readily be done by a cylinder and plunger working in oil, the plunger valve allowing free compression of the spring but limiting the return to the speed of a leak. This would stop the relaxation of the spring in the drop, the rattle probably at all times, and the lag of the wheels and axles in the rebound. Such a device would hardly be necessary for the cushion-spring, though applicable.

But perfect government of the action of a pneumatic tire has not yet been devised. It seems impossible. The pneumatic tire is too resilient despite regulation of the springs as outlined above. The area of the contact multiplied by the internal pressure is always equal to the load and as the load is augmented by the drop or the lift the rebound must always come. Various designs are existent, placing the tube within the wheel, in which the action of the rim about the hub could be regulated. But heat and abrasion, the destroyers, make this but a sorry makeshift.

Puncture Not a Tire Destroyer

We hear much of punctures. The puncture, although it may deflate a new tube, need scarcely be considered as a tire destroyer. Neither should outside abrasion. Real punctures are exceedingly rare. Abrasion of cotton is the tire destroyer. Do you remember the see-saw of string you made in your youth and how quickly the string cut through? That is the action going on in the shoe whenever the car moves and it cannot be stopped or remedied. Anyone who buys a puncture-proof tire or tube or cover, or who has an old shoe retreaded is a gull.

But, after all, the greatest discontent comes from the interruption. Is there an automobilist who would not welcome a wheel of fair carrying performance, provided he knew it would so carry with all the certainty of his father's carriage wheels? How if it were impossible for a pneumatic-tired wheel to equal its carrying-performance?

In November, 1910, a set of spring wheels, with solid tires, were installed on a certain car. The front wheels have been on the car continually since and have never caused one moment's delay. On two occasions in 1912 one spring was broken in the right wheel and replaced the next day, the car running as required meantime. The original rear wheels were taken off in August, 1912, to make way for an improved set. They had never caused one moment's delay. One spring broke in the right wheel of this pair in August, 1911, on a Friday and was replaced the following Tuesday after running 350 miles. The broken spring made no difference in the riding and did not rattle, though still in the wheel. The rear wheels last installed have had no repair of any kind. They have traveled 5,000 miles, the old rear wheels 7,000 miles, the front wheels 12,000 miles. The front tires, side wire type, are worn .75 inch in diameter, but the corners are mostly there. They will probably give out in the base, as such tires do, but look good for many miles. The present rear tires, wireless, show little wear. If they wear down to the hard rubber, as the manufacturers say they may, 30,000 miles is easily within their life.

The car equipped with spring wheels weighs 800 pounds more than with pneumatic-tired wheels, but without change of engine or carbureter ran 30 per cent. farther per gallon of gasoline in 1911 than with pneumatics in 1910. The dust raised is very much less; steering very much easier.

The wheels are not as resilient as pneumatics. On smooth pavement no difference in riding can be noticed. On rough roads they excel pneumatic-tired wheels; no passenger has ever admitted to leaving the seat. This car, as all single-tired solid-tired cars do, skids very easily. Chains can be used as on pneumatics and, very strangely, the passenger is hardly aware of their presence.

The study of spring wheels was started in 1904; the course is not yet completed. It is easily possible to make springs of long life to carry any load. A truck-wheel combination can be built without rubber which will on any road absorb the full quantity of power delivered to it from the engine.

Buffalo, N. Y. HARRIS T. DUNBAR.

Wants to Tour in New Jersey

Editor THE AUTOMOBILE:—I intend to run down to New York City this summer and would like to tour in New Jersey for a few days.

2—Will it be necessary to have a New Jersey license or permit? CARL E. FOSTER.

Syracuse, N. Y.

—1—It will not be necessary to get a New Jersey license providing you do not stay in the state more than 10 days.

—2—In mapping out a route from Syracuse to New York City and then touring New Jersey, we would suggest that you follow the routes given in the Blue Book (Nos. 321, 330, 497, picking up 455 at Owego, 409, 152-R and 51-R), passing through the following cities: Ithaca, Binghamton, Scranton, Delaware Water Gap, into New Jersey at Easton, thence through Hackettstown, Morristown, the Oranges, Newark, Weehawken and across the ferry into New York City. The roads are in excellent condition. There are many beautiful and interesting tours in New Jersey, the favorites being the run down the coast and that through Lakewood and the hills of the northern part of the state.

Using Liquid Carbon Remover

Editor THE AUTOMOBILE:—I want to use a liquid carbon remover. The directions tell me to put the liquid into the cylinder and leave it there for a couple of hours. As it takes a large quantity for each cylinder and as the stuff is very expensive, I would like to know if, in your opinion, it would harm to use the same liquid for more than one cylinder after it has stayed in there for some time.

Brooklyn, N. Y. READER.

—It will do no harm to use it if you can. In many motors, the piston rings are not tight enough to hold the liquid for a

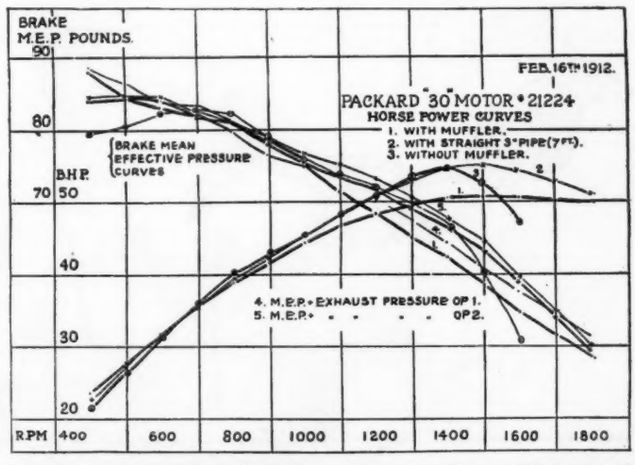


Fig. 1—Curves showing the effect of the use of a muffler cut-out on the power developed by the motor

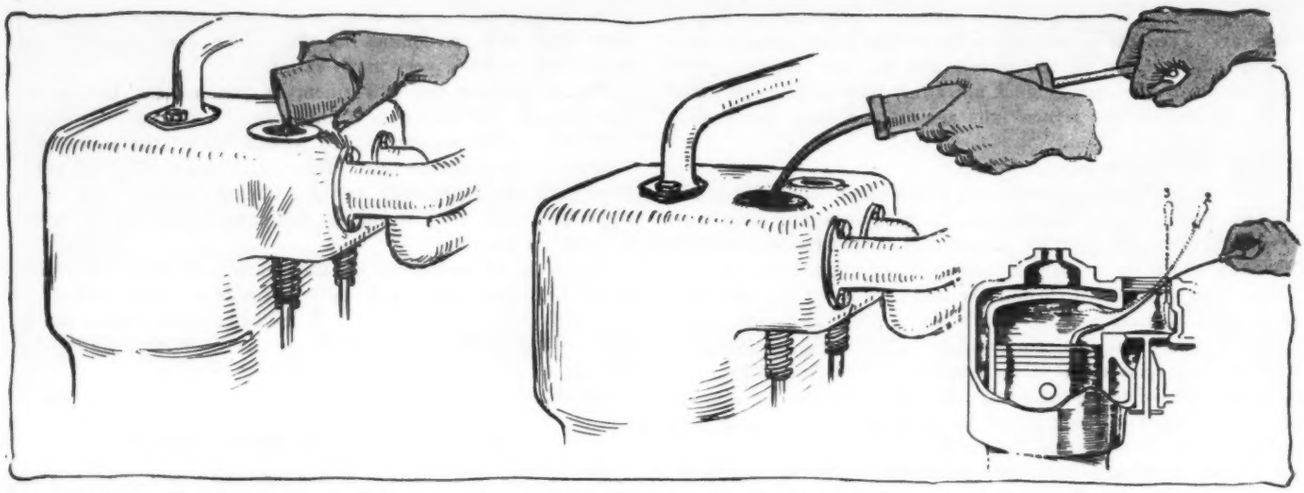


Fig. 2—Showing the steps in the application of a liquid carbon remover to the cylinders. Left, pouring in the remover; center, drawing it out by means of an oil gun; right, using the scraper

long enough time. The liquid can be drawn through any one of the openings in the top of the cylinder by means of an oil gun, as shown in Fig. 2. It is best to remove the valve cover cap and then the opportunity of using a scraper to take out any loose pieces is presented. In the illustration the method of working the scraper around is shown.

Carbureter Cleaned with Air Blast

Editor THE AUTOMOBILE:—My car has suddenly developed a bad case of asthma, or whatever the corresponding disease in an automobile may be. When in good health it will respond quickly to the throttle and will fairly jump forward when the accelerator pedal is pressed. Since it developed the strange malady, however, it has been behaving in a very singular manner. When the accelerator pedal is pressed it will sputter a few times and then the motor will die. If I quickly throw out the clutch and let the car coast, it will start the motor again by the momentum of the car. The motor will then run about a half minute and repeat the performance. What can be the matter with the car? What is the cure?

Williamsbridge, N. Y. R. T. CORRY.

—Your gasoline line is dirty and does not allow the fuel to flow through the line as rapidly as it should. As soon as some of the gasoline at the top of the float chamber is consumed, the motor will stop until a sufficient quantity oozes through the line for it to run a short time again. The motor will then stop again and you will have to shut it off for a while. The quickest and best way to cure the trouble is to blow out the carbureter line and the carbureter itself with compressed air. Remove the auxiliary air valve cage or any other removable parts of the carbureter, as shown in Fig. 4, and put the air hose for tire inflation into the opening. Turn on a good strong current of air. Empty out the gasoline tank and then put the air hose against the gasoline feed line and blow back towards the carbureter from the tank end. If you desire to blow through from the other end, disconnect the pipe line from the tank so that any dirt in the line will not be blown into the tank. Take the needle valve out of the carbureter and blow through the jet opening also.

Finding and Curing Plug Trouble

Editor THE AUTOMOBILE:—How do you find out when ignition trouble is in the plugs and not some other part of the electric equipment? I run continually on a high-tension magneto and of late have had a little ignition trouble. It is a perpetual miss in one cylinder at low speed. If the trouble is in the magneto I wont touch it, but will send it to the factory. If it is in the plugs I will renew the plug, but do not intend to buy a new one until I find out if it is possible for a plug to operate at high speed and not at low.

Boston, Mass. ALICE AMES.

—You could find out in 5 minutes if the plug was bad and you knew what cylinder was missing by simply changing the plugs around and seeing if the miss still occurred in the same cylinder. You can readily locate the cylinder which is missing by the method suggested in Fig. 3. By means of a screwdriver each plug is short-circuited in turn. When the cylinder that is missing is short-circuited there will be no difference in the running,

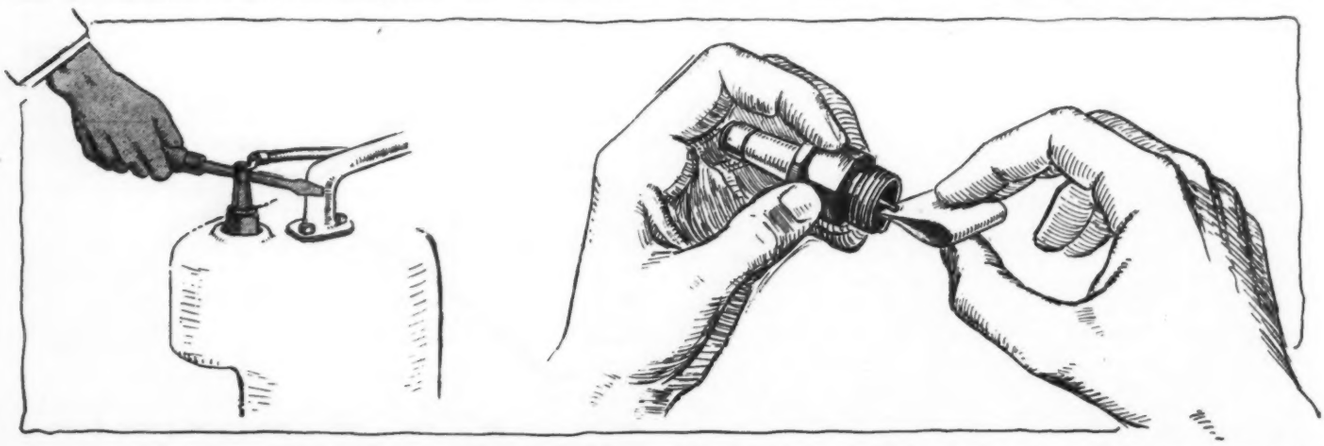


Fig. 3—At the left is shown an easy method of locating a cylinder which is missing fire, while at the right is a handy way of gauging the sparking gap on a plug suspected of missing fire

Fig. 4—Cleaning a carbureter with an air blast. Left, compressed air tube with a piece of copper tubing in the end for a nozzle; center, auxiliary air valve cage; right, blowing out the carbureter

while each of the other three will cause a noticeable falling off in power and speed. If changing the plugs around then shows that the miss always occurs in the cylinder that has the bad plug, examine the points and if they seem too far apart, they can be gauged by a card which has been folded over in the manner shown at the right, Fig. 3. The points should not be farther apart than 1-32 inch or closer than 1-64 inch.

Racing Game as a Business

Editor THE AUTOMOBILE:—Kindly inform me why the racing game cannot be put on a basis that would enable a driver (with ordinary means) to buy his car, or cars, and race them as a business proposition as well as the sport. It seems that the promoters of race meets, with the co-operation of drivers and manufacturers, could get together and put the game on a very firm foundation. At any rate, I would like to see the proposition discussed through THE AUTOMOBILE.

Lexington, Ky. WILLIAM B. BROWN.

—There is one reason why the racing game will probably never attain the elevation of a profitable business except perhaps on certain special tracks near large centers. In order for the drivers to earn sufficient money to make them go into the races as a regular calling there would have to be races frequently during the year. Otherwise there would not be money enough in it to pay a large number of men engaged in this work. The tracks on which the races are held are so large that they are exceedingly costly and require an enormous capital. This is especially the case when erected near cities large enough to support them and it has been noted that unless there is a particularly brilliant entry list, public interest is small. In tracks like the Speedway at Indianapolis or many other local tracks scattered throughout the country there will always be motorcycle and automobile racing and it will pay fairly on the investment. This is true where these races are held near an amusement center, such as the Brighton Beach track at Coney Island, New York City. The big national events are few and far between and these attract the main interest.

Waterjacket Leak Can Be Plugged

Editor THE AUTOMOBILE:—Is it necessary to have a welding job done on a cylinder in which there is a small leak due to a blowhole in the casting? This would be more of an expense than I care to stand just now and yet I cannot allow the cooling water to leak, especially at this time of the year.

Englewood, N. J. SUBSCRIBER.

—It is possible to mend a very small leak by plugging it, but if the leak is large or has a crack of any length extending away from it, it would be better to have it welded. On a small blowhole it will probably be possible to make the repair by means of an ordinary iron gas plug. The steps in the operation of making this repair are simple and are clearly shown in Fig. 5. The hole is first drilled to the size of the nearest possible plug. A half-inch gas pipe thread will have an internal diameter of .622 inch and the thread is the regular 1-2-inch taper pipe thread. The plug is dipped in red lead and screwed firmly in place and then sawed off. This will give a neat-looking job and if done right it will be nearly impossible to tell where the repair was made. The plug can be brought down to the level of the surrounding metal by means of a heavy coarse file. If it is desired to make a still neater job than is obtained by sawing off the plug and filing it down, a touch of paint or a repainting of the cylinder block is possible.

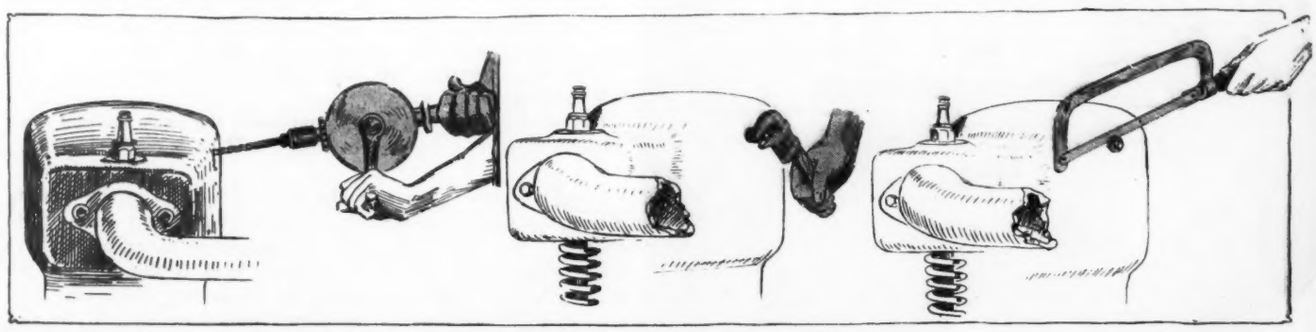


Fig. 5—Three of the steps in the plugging of a leak in the waterjacket. Left, drilling the leak to fit the plug; center, screwing in the plug; right, sawing off the head of the plug

Monarch Has Left Steer and Center Control

Long Stroke and Syphon Cooling Are Features—Car Built Light and Strong—Complete Equipment

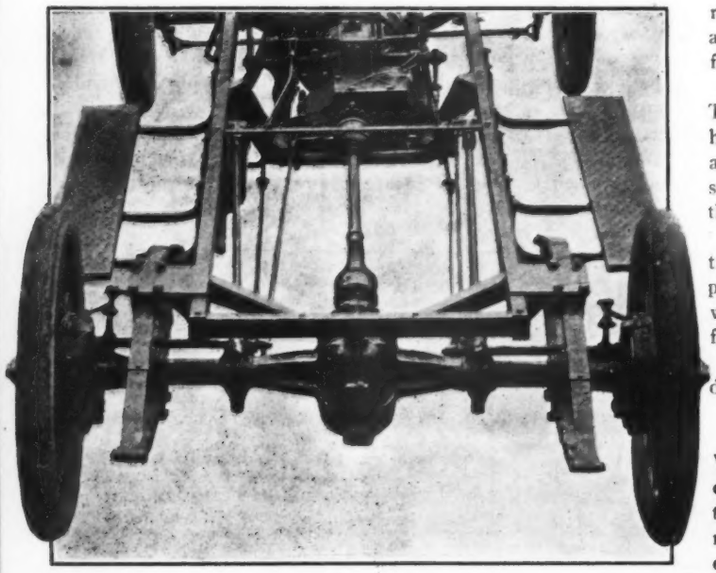
THE Monarch Motor Car Co., one of Detroit's youngest motor car building companies, the announcement of the formation of which was made in THE AUTOMOBILE recently, has made known the details of its product, which is now undergoing road test.

The car will present a very attractive appearance, having a streamline body of the torpedo type with the hood sloping down to the front as found on the Renault cars abroad and on several American makes. Probably the most unusual feature of the new design is the placing of the radiator under the hood, so that when the latter is raised, the cooling device is exposed. The filler cap of the radiator comes through the hood at the front, as shown, making it possible to fill it in the usual manner. Another feature is the placing of the gasoline tank under the cowl at the front of the dash, which is a growing tendency in this country as evidenced by the number of cars which have been designed in this way in the past year.

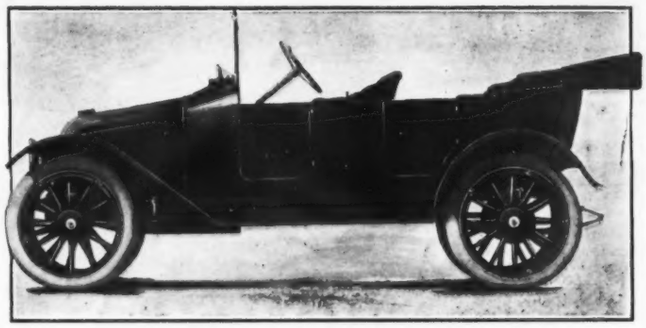
Considering the chassis in general, it is made up of three principal units, the motor, gearset and rear axle with the conventional methods of connection between these. A view of the rear system is shown herewith.

The motor is of special design for the car and is constructed along European lines in that it has a small bore and a long stroke, making for maximum power with low gasoline consumption. It has a stroke of 5 inches and a bore of 3 3-16 inches, giving a horsepower rating of 25. The cylinders are cast in pairs and are water-cooled, as already brought out. The cooling system is of the thermo-syphon type, eliminating the use of a circulating water pump.

The motor and gearset are mounted on tabular members which parallel the side frame rails and are hung from dropped cross-frame members at front and rear. This is clearly shown in the illustration. The motor has a forged crankshaft, which is carried on three main bearings fastened to the upper half of the crankcase. The connecting-rods are also forged and of light weight, as are also the pistons. The wristpin bearings are bronze bushed, while the wristpins themselves are light and hollow. The aim has been to obtain as light a set of reciprocating parts as possible, to aid in the elimination of vibration and to prevent injury to the motor when running at high speeds.



View of rear axle assembly of Monarch



Left side of five-passenger touring car

The timing gears at the front of the power plant are spirally cut and are accessible on removal of the gear cover in the conventional way.

The carbureter is placed on the right side of the motor and has a very short intake pipe with no pockets which is intended to prevent any condensation of gas. The carbureter feed pipe from the gasoline tank is also very short due to the close position of the tank to the carbureter. The chief advantage of this is that a flow of fuel is assured on grades and as long as there is any in the tank.

The lubrication is of the forced feed type, operated by a plunger pump worked through connection with the camshaft. The oil is pumped from the bottom of the crankcase up to the timing gears and to the main bearings, whence it feeds to troughs under the connecting-rods. These splash the lubricant up into the cylinders, lubricating the pistons. It then flows down into the reservoir at the bottom ready for recirculation.

Springs Under Clutch Leather

A leather-faced cone clutch is used, the cone having a 13-degree angle. Clutch-facing springs are placed under the clutch leather for easy engagement. The change gearset is of the selective sliding gear type, having three forward speeds and reverse. The power is carried to the rear axle through a substantial drive shaft, which is not enclosed. It is equipped with two universal joints, one at the forward end and one at the rear axle. The drive is carried by two side radius rods, which are attached to the axle and to brackets fastened to the side frame rails at their forward ends.

The rear axle is of the semi-floating variety with bevel drive. The ratio is 4 1-3 to 1. The brakes are mounted on the rear hubs and are external contracting and internal expanding, having a diameter of 12 inches and a width of 2 inches. The rear springs are elliptic, under-slung from the axle and swiveled on the bottom.

Other features are the left-hand drive and center control, electric cranking and lighting. As to equipment, this is most complete, consisting of demountable rims, electric horn, rain-vision windshield, extension top and side curtains, speedometer and full complement of tools.

The wheelbase is 110 inches, and while the price has not been definitely settled, it is thought that it will be $1,050.

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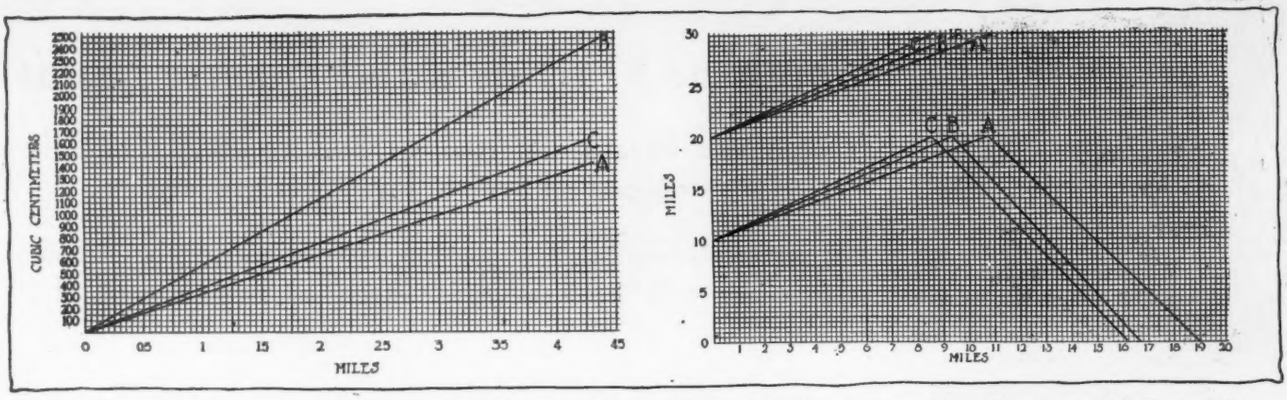
EVERY BATTERY BOX has or should have a drain in the bottom. Where the battery is located on the runboard this drain is ineffectual. For that reason the box should be raised a bit above the running board even if the drain hole is carried through the running board. This will permit the electrolyte which may spill out from gathering under the bottom and destroying it. It also can be washed out whenever the car is cleaned.



Left, fuel consumption curve. A, kerosene; B, alcohol; C, gasoline. Right, acceleration curve. A, kerosene; B, alcohol; C, gasoline

Two Fuels from Kerosene and Alcohol

MILWAUKEE, WIS., June 9—A contender for the $100,000 prize offered by the International Association of Recognized Automobile Clubs for the best substitute for gasoline as a motor fuel has appeared in Milwaukee in the person of Prof. Frederick C. Raeth, who, with Kurtis R. Froedtert and William A. Biesmann, of Milwaukee, has perfected two different motor fuels, one using kerosene and the other denatured alcohol as a base.

Common kerosene and ordinary denatured alcohol, chemically treated by a secret process evolved by Professor Raeth, form fuels which in tests on air and water-cooled motor car engines and on small stationary or farm engines prove to be at least as good as gasoline and in some ways much better. Professor Raeth and his associates pursued their investigation in the direction of treating denatured alcohol to make it suitable as a fuel for internal combustion engines with the idea of appealing particularly to Europe, where the denatured alcohol industry has made great strides under the influence of governmental inducements. The cost of treatment adds but .5 to .75 cent per gallon to the price of the fuel.

Comparative tests of gasoline, the kerosene fuel and the denatured alcohol combination were made under the same conditions, and in point of fuel economy kerosene ranked first, gasoline second and alcohol third, as follows:

Fuel	Spec. Grav.	Distance, Miles	M.P.H.	Fuel Consumption, Pints
Alcohol	0.835	4.3	20	5.28
Gasoline	0.70	4.3	20	3.36
Kerosene	0.805	4.3	20	2.24

The test was made on an Auburn five-passenger touring car, carrying a four-cylinder Rutenber motor rated at 40 horsepower and equipped with a Rayfield carbureter, hot-air-jacketed. The course of 4.3 miles through Wauwatosa provided practically every highway condition.

An ordinary aspirator bottle, with a capacity of about 1,750 cubic centimeters, graduated up to 1,500 cubic centimeters was used as a container for the various fuels. A split-second stopwatch was used.

A striking characteristic of the denatured alcohol fuel was the ease of starting the motor. The temperature at the time of the tests ranged between 57 and 63 degrees Fahrenheit. The car was drained of gasoline and allowed to cool for about 10 minutes. The alcohol fuel was then introduced and the motor started as readily as with gasoline. It was immediately noticeable, however, that the motor was being starved, and the fuel adjustments of the carbureter were opened several turns, the air adjustment remaining untouched. The car was then run at a speed of 20 miles per hour over a distance of 4.3 miles, which required 5.28 pints of fuel. More difficulty was experienced in keeping the car at 20 miles per hour than with gasoline.

Then the motor was operated on gasoline. The kerosene was introduced as the alcohol had been previously, and the motor turned over. The motor started readily, but lagged after a few revolutions, when the gasoline vapor in the cylinders was exhausted. It was necessary to do considerable adjusting on both air and fuel valves of the carbureter in order to make the kerosene mixture run the motor smoothly. After the motor became hot, the sluggish action disappeared and the car was run 4.3 miles on 2.24 pints. The motor did not at first show the life and dash that was displayed on the alcohol fuel and on gasoline. It climbed hills with much less labor than on either alcohol or gasoline. The kerosene used in the test was of the lowest grade.

Each time the motor was stopped it was necessary to use gasoline before throwing in the kerosene fuel.

Gasoline came out ahead in the acceleration tests. It required 8.5 seconds to accelerate the car from 10 to 20 miles per hour and 8.75 seconds to accelerate from 20 to 30 miles per hour on gasoline. Alcohol ranked second, the 10 to 20-mile acceleration being accomplished in 9.5 seconds, and 20 to 30 miles, 10.5 seconds. On kerosene, it required 11 seconds from 10 to 20 miles and 11.5 seconds from 20 to 30 miles. The specific gravity of the kerosene used in the formal test was .805, or 43 degrees Beaumé. The boiling point of this mixture was 112 degrees Centigrade.

The alcohol fuel tested for specific gravity at .835, or 38 degrees Beaumé, and had a boiling point of 67 degrees Centigrade. Neither of two Raeth fuels has an offensive odor. At no time was smoke detected at the exhaust while the car was running.

Filling the aspirator bottle with fuel for the test

Henry Souther, chairman of the General Standards Committee, who presented the report of the Iron and Steel Division

Combine Hardness and Elastic Limit

Iron and Steel Committee of Society of Automobile Engineers Furnish First Test Figures

Progress Made in Standardizing Demountable Rims—Nomenclature Division Shows Activity—Other Committee Report

THE healthy condition of all divisions of the Standards Committee of the S. A. E., the work of which is the most important feature of the society, was evidenced from the comprehensive reports of the older divisions and the progress reports of the more recently-formed divisions of the committee.

There were in all ten divisions scheduled to present reports at the session. Seven formal reports were heard and variously disposed of, while three of the divisions, though unable to provide anything definite at this time, stated through their chairmen that they were progressing and would undoubtedly be able to report at the winter meeting. Three were referred back to their divisions for further consideration, these being the fifth report of the Broaches Division, the fourth report of the Ball and Roller Bearings Division and that part of the report of the Electrical Equipment Division which referred to wiring systems.

The following shows the society's disposition of the Standards Committee's work:

Division	Chairman	Disposition
Iron and steel	Henry Souther	Accepted with amendment.
Ball and roller bearings	David Fergusson	Referred back.
Truck standards	Wm. P. Kennedy	No report.
Commercial car wheels	Wm. P. Kennedy	Accepted.
Electrical equipment	A. L. Riker	Wiring systems sub-committee referred back. Insulation sub-committee showed progress. Standard instructions for battery makers sub-committee accepted.
Broaches	C. W. Spicer	
Passenger car wheels	Henry Souther	Referred back.
Nomenclature	E. J. Stoddard	No report. Progress.
Miscellaneous	Arthur Holmes	Accepted. Progress.
Motor testing	J. O. Heinze	Accepted.

The fourth report of the Iron and Steel Division of the Standards Committee was presented by Henry Souther, chairman.

Iron and Steel Division Reports

The materials specified in detail hereinbefore include the most important ones available to the builder of automobiles. It is obvious that there are more kinds of material specified than are likely to be used by any one manufacturer.

The results of physical tests, whether tension tests or otherwise, are largely dependent upon the mass and form of the specimen tested. this is particularly true of heat treated steels. For the foregoing reason, all results of physical tests are comparative, and in order to make the comparison a proper one a uniform test specimen must be used.

The committee therefore decided that recommended practice should be the use of the S. A. E. standard test specimen, this specimen to be treated always in its finished form and not in the rough shape from which the finished specimen might be cut.

The figures for physical characteristics refer to those obtained on specimens prepared from sections common in automobile use, that is, bars from 1 inch round up to 1.5 inches round. The high yield points may be obtained with severe heat treatments, and the lower yields points with treatments less severe.

The yield point is specified rather than the elastic limit. The yield point is measured by the drop of the testing machine beam and may safely be relied upon for material having a yield point not in excess of 100,000 pounds per square inch. With materials having a yield point in excess of 100,000 pounds per square inch the true elastic limit should be obtained by means of an extensometer.

In addition to the usual physical characteristics the "hardness" tests have been considered, as obtained by means of the Brinell ball test and the Shore scleroscope. The Brinell test recommended by the committee is the use of the 10 millimeter ball and 3000 kilogram load. It is pointed out, however, that the Brinell test must not be used on soft steels less than .5 inch thick, or an areas small enough to permit the depression to flow toward the edges of the specimen. With hard steels, where the depth of the depression and the flow of metal are less material as thin as .25 inch may be so tested. The Brinell test may be fairly made on surfaces that are free from scale and smooth.

The Shore test (scleroscope) must be used only on surfaces that have been carefully polished and free from all tool marks, file marks or grinding scratches.

The report further gives the specifications for carbon steels, screw stock, steel castings, nickel steels, nickel chrome steels, nickel-chromium-vanadium steels and silico-manganese steel.

For valves, and especially exhaust valves, high-speed tool steel is now being used. The exact analysis of this grade of tool steel is not important, as there are many kinds available, all more or less alike in composition. The chief characterstics of such steels are the tungsten (18-20 per cent.) and chromium (4-10 per cent.) contents. This quality of steel has proven very successful in the case of motorcycle valves, where the heat is intense.

The use of specifications for cast-iron in the present state of the foundry art is not very easy. The foundryman, if he is not accustomed to work to analysis, will object, although his iron may be within the specifications given 90 per cent. of the time. Moreover, if there are any defective cylinders he will be likely to lay it to the composition of the iron, whereas the fault may lie in his foundry methods, apart from composition.

Consequently these specifications should be used as indicating the ideal mixture—something for the foundryman to work to, even though he may not be willing to guaranee the analysis.

If trouble is experienced with cylinders, analysis of samples of the iron will show whether or not the composition is somewhere near what it should be. If the composition is very far from the specification here given, the purchaser will be justified in putting up strenuous objection.

Iron in accordance with this specification will be strong and reasonably close-grained in the thicknesses cast, and one that wears well.

The remarks made in connection with the gray iron specification apply even more strongly to malleable iron. Iron of the composition given, properly annealed, will make a strong and tough casting; but improperly annealed it will not make a good casting.

Castings that are received brittle may be so from two causes: First, unsuitable mixture of iron; second, incomplete annealing. Consequently, if brittle castings are received, they should be analyzed, and if the analysis is correct, then it is certain that the annealing operation was not properly performed.

The following table is a sample of those included in the Iron and Steel Division's report linking the hardness with the other properties of the various steels.

Physical Characteristics of Carbon Steels

Spec.	Treatment	Elastic Limit	Red. of Area	Elong. in 2"	Brinell Hardness	Shore Hardness
10-10	.....	.....	....	....	...	..
10-15	.....	.....	....	....	...	..
10-20	Annealed	36,000	70.3	40.5	100	..
10-20	C-500° F. Draw.....	77,000	55.5	14.5	189	..
10-20	C-1200° F. Draw.....	50,000	65.5	32.0	...	..
10-25	Annealed	44,000	56.0	33.5	126	21
10-25	C-750° F. Draw.....	70,000	61.1	21.5	196	32
10-25	C-1100° F. Draw.....	58,500	67.0	28.5	170	27
10-30	Annealed	38,500	51.9	30.0	156	27
10-30	C-500° F.	85,000	17.0	7.5	255	38
10-30	C-1100° F.	66,500	51.1	22.0	207	33
10-30	C-500° F.	104,000	54.0	9.5	276	..
10-30	C-1200° F.	58,000	71.4	34.3	160	..
10-35	Annealed	43,000	50.0	27.0	158	..
10-40	Annealed	41,000	46.0	21.0	...	..
10-45	Annealed	48,000	50.6	29.5	143	22
10-45	Annealed	49,000	35.0	21.5	166	..
10-45	C-750° F.	94,000	49.0	17.0	255	40
10-45	C-1100° F.	71,000	57.3	23.0	207	30
10-45	C-850° F.	85,500	34.0	14.5	286	42
10-45	C-1100° F.	76,500	43.5	18.0	241	37
10-45	C-1200° F.	75,000	59.7	23.0	215	..
10-95	Annealed	50,000	37.5	21.5	187	29
10-95	F-750° F.	150,000	19.5	8.5	402	61
10-95	F-1100° F.	103,000	29.0	14.0	277	48

Physical Characteristics of Nickel Steels

Spec.	Treatment	Elastic Limit	Red. of Area	Elong. in 2"	Brinell Hardness	Shore Hardness
23-10	.....	.....	....	....	...	..
23-15	.....	.....	....	....	...	..
23-20	Annealed	57,500	65.0	30.0	143	..
23-20	Annealed	43,000	62.0	27.0	170	..
23-20	H-600F.	140,000	61.0	14.0	330	..
23-20	H-1000F	95,000	72.3	20.0	216	..
23-20	H-600F.	155,000	59.5	13.5	340	..
23-25	Annealed	.....	....	....	...	..
23-25	H-600F.	175,000	58.5	13.5	394	..
23-25	H-1000F.	107,000	71.3	21.5	235	..
23-25	H-600F.	180,500	60.5	13.5	405	..
23-25	H-1000F.	115,000	69.8	20.0	267	..
23-30	Annealed	63,000	63.0	27.0	163	..
23-30	H-600F.	187,000	57.5	13.0	405	..
23-30	H-750F.	123,000	57.3	15.0	269	41
23-30	H-1100F.	87,000	67.7	25.0	207	30
23-30	H-1000F.	120,000	62.5	17.5	288	..
23-35	Annealed	62,500	58.0	26.5	165	..
23-35	H-1200F.	101,000	66.9	24.0	220	..
23-35	H-600F.	200,000	57.5	12.3	415	..
23-40	Annealed	65,000	57.3	27.0	168	..
23-40	H-1200F.	104,000	65.4	24.0	225	..

Physical Characteristics of Nickel Chromium Steels

Spec.	Treatment	Elastic Limit	Red. of Area	Elong. in 2"	Brinnell Hardness	Shore Hardness
31-10	.....	.....	....	....	...	..
31-15	.....	.....	....	....	...	..
31-20	Annealed	41,000	54.0	32.0	153	21
31-20	M-600F.	150,000	20.0	5.0	351	56
31-20	M-1200F.	90,000	61.0	16.0	228	35
31-25	.....	.....	....	....	...	..
31-30	Annealed	57,000	55.0	26.0	172	27
31-30	M-600F.	171,000	25.0	7.5	384	60

Considering the report, the chairman stated that as soon as the physical and chemical specifications for any metal were coupled together in making requisition for any grade of material, trouble for the steel works was likely to result. It was therefore requested that either the chemical or the physical system be adhered to in ordering, and not a combination of both.

The report contains the first data yet published by the division connecting the elastic limits and the hardness of steels. This is but the start of investigation to link these properties.

The specifications for valve materials have been omitted from the present report. In their place reference has been made to what would seem to be the ultimate metal for valves. It is a grade of high-speed tungsten tool steel, which has as much as 18 per cent. tungsten content.

In some cases the yield point of the material has been substituted for the elastic limit, this being regarded as the logical property to specify, as to the trained man the yield point clearly indicates the elastic limit. No attempt has been made to define the elastic limit in these specifications. Of course, for the harder steels there is no yield point and the extensometer is then called into play. In a word, the division is splitting no hairs as to the specification and leaves it up to the trained observer to tell whether the specimen is up to the elastic limits required for his work.

George F. Fuller, Wyman & Gordon Co., objected to the insertion of data in the report which were not borne out by a great many tests. The physical properties of steel he characterized as being the most important feature. Any definition of them should, therefore, be approached with the greatest circumspection. They may be only recommended practice, he said, but in the trade they have become to be regarded as actual specifications which must be lived up to by the steel companies. Mr. Fuller called attention to a number of discrepancies in the tables of physical characteristics of the various steels.

Chairman Souther pointed out that the list of physical characteristics as printed has no relation whatever to the specifications, instructions or notes contained in the body of the report. They are mostly freaks, he said, which have been published to show what results have been obtained in different instances. It was his contention that it is only by the publishing of such figures as these that any results are obtained and any accurate gauges secured.

In these tables an attempt has been made for the first time to incorporate data on the Brinnell hardness tests and on those obtained with the Shore scleroscope. The data of this kind are slowly accumulating and becoming more valuable. They have the advantage that they can be applied to every individual piece without mutilating or destroying the piece in any way, whereas most physical tests ruin the test piece for further use. This information is being gathered at the request of the society, and while there are many discrepancies, the data have been secured from widely divergent sources and under many conditions which accounts for them.

Mr. Fuller advocated that from fifty to 100 tests be made of each kind of steel before the data on that kind be published, stating that they are bound to be used by some.

To close the discussion, Chairman Souther proposed a paragraph be placed over the tables of physical characteristics to the effect that the lists are only possibilities, not for use in connection with the purchase of steels and must not be used as such. He showed that it would be next to impossible to wait for 100 tests of each metal as this would never get the data anywhere. A beginning has been made at least.

With this paragraph inserted over the physical characteristic tables the report was accepted by the society.

Light Wiring Report

The report of the sub-committee on one and two-wire systems for electric lighting was presented by David Fergusson, who stated that they could not recommend the one-wire system, while they favored it, and that the committee had not yet reached a conclusion. The work was referred back to them.

Frank Conrad, Westinghouse Electric & Mfg. Co., read the report of the subdivision committee on insulation. This was a progress report because it had not been referred back through the parent Standards Committee for its approval. It was the belief of the members of the sub-committee, however, that a 600-volt test for insulation on the car wiring was correct, although many thought it was too high for automobile work. He stated that the American Institute of Electrical Engineers would probably co-operate in this standard.

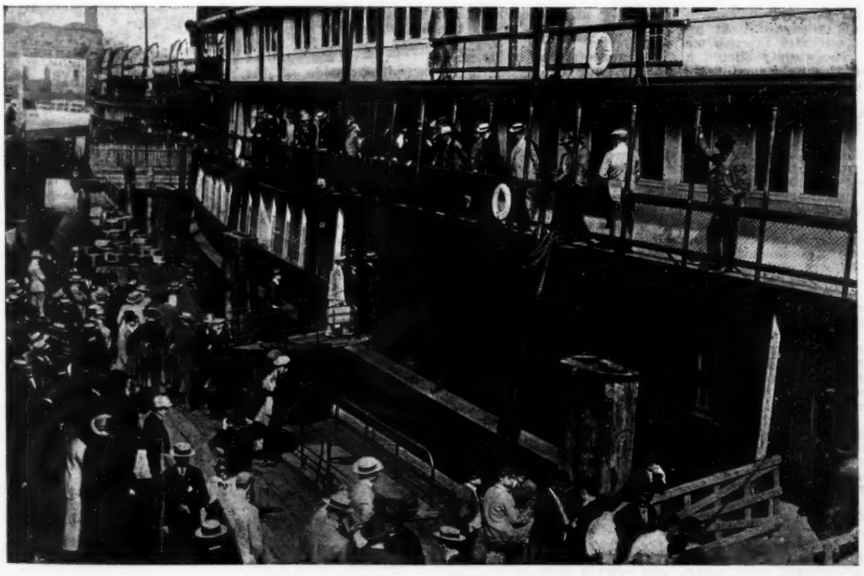
E. T. Birdsall stated that he thought the test should be 1,000 volts alternating current because the insulation might stand the 600-volt test when new and then in the course of a few months might fall off to such a degree in quality that it would not. If the 1,000-volt test were given it would be sure to guarantee the fact that the insulation would withstand the 600 volts a few months later.

William H. Palmer, Jr., Electric Storage Battery Co., read the report of the sub-committee on standard instructions for battery makers. This committee had submitted the instructions to five prominent storage battery makers who had agreed to them. The instructions follow:

1. Put the battery where it can be seen.
2. Make a rigid installation.
3. Put water in it from time to time and then leave it alone.

The report was accepted and unanimously adopted.

W. H. Conant, Gould Storage Battery Co., asked if there was any tendency to standardize the sizes of batteries. He thought



S. A. E. party embarking on City of Detroit III on Wednesday for sessional excursion to the Soo and Mackinac Island

that there ought to be some work done by the committee in at least standardizing battery sizes for batteries of given capacity rating. This was put in the form of a motion and the work turned over to a committee.

Miscellaneous Division Report Accepted

A short report of the Miscellaneous Division was submitted and accepted. Further standardization of yoke and rod ends, magneto couplings, etc., was reported.

A sub-committee on carburetion is working to advantage, but was not ready to report.

The second report of the Nomenclature Division was one rather of progress, and in order to show the line along which the division has been working, some correspondence carried on with the I. A. E. was read. That body is co-operating with the S. A. E. in this work, as is also the patent office. Charles Wheeler, I. A. E., of the sub-committee of the standards committee of the I. A. E., assured the society that it has gone on record as proposing to confer with the Nomenclature Division before publishing any accepted terms. The I. A. E. committee also has the co-operation of the various other similar committees of Europe and also of the state department of England.

It has been found that the technical nomenclature of England and that of this country are quite different and it is proposed to eliminate differences wherever possible.

It was also stated that the rubber industry is reducing its nomenclature by some forty or fifty terms relating to the various grades of rubber, which is of interest in this connection.

Long Nomenclature Division Report

Excerpts from the rather lengthy report of the Nomenclature Division by E. J. Stoddard, chairman of the division, follow:

Without some standard, or criterion, confusion and chaos are inevitable.

The general language has an abundant literature which, within its recognized scope, establishes a usage with a particularity and absoluteness that is effective and almost proverbial. Ben Jonson is quoted as saying:

"A man coins not a new word, without some peril, and less fruit; for if it happens to be received, the praise is but moderate; if refused, the scorn is assured." "Supplee's Trench," 249.

In engineering it has seemed to me that the author has relied upon his publisher, and has shrunk before the literary frown as Napoleon before Talleyrand. I have not found engineering books consistent authorities on literary usage.

In automobile engineering we have at best a very scanty and incipient literature.

The nomenclature of the automobile is a part of the English language. Those conversant with the art are the most competent to form a judgment as to it.

The world has a right to ask for a suitable medium of intercommunication.

The profits and prestige of the profession depend upon the public estimate thereof. One might as well try to increase his income at doing piecework for an indifferent and absentee employer, as to increase his prestige and income solely by perfecting himself in the work of his profession. We know that the demand will advance as fast, or faster, than the increase in strenuousness and facility. The result is, of course, inevitably suicidal. The modern Prometheus will also be bound to the rock by his admiring and loving friend.

The public must be led in the right direction. It is willing enough to go.

Some of the arts and professions have a most impressive vocabulary. In the past the coinage of imposing words has had its effect upon the ignorant and unlearned. At present it is more apt to excite prejudice. It is not in accord with the spirit of engineering.

The society should not be characterized by words that express the egotism of the unlearned and indolent, nor the egotistical and selfish pride of the scholar.

Not by the unsupported decree of the society; the prestige of the French Academy was not sufficient for this. There can be no purely "Fiat Nomenclature."

It must be by the resolution of the society expressing, generally, a correct judgment, and this resolution must be consistently backed up and enforced by the influence of the society and each of its members. We must not only be right, we must be effective. I think the automobile engineers have a peculiarly favorable public to appeal to. It is made up quite largely of men of wealth, liberality and intelligence.

It is our duty individually and collectively to see that the reputation of the society is sustained in recommending a correct usage, by our influence making this recommendation effective; and it is also, and equally, our duty as members of society to see that the proper usage which has been recommended is adopted.

A judgment in each instance must be formed in view of, and in accordance with, a large number of facts. These facts must be collected so that they may be used to verify our judgment.

There is a great mass of material, good, bad and indifferent, that must be collected, sorted, trimmed, and its deficiencies supplied. This involves much work, and ability; it should be done largely by private enterprise, and the workman should reap his reward both pecuniarily and in the esteem of the members of the profession. The society as a whole is not adapted to this detail work.

On the other hand, it is very well adapted to record a judgment and distinguish between conflicting usages; or even, by getting the members together and testing them to work on a common line, to bring about a consensus of opinion which shall determine a usage; and this consensus of opinion, through the instrumentality of the society, may be brought about with data and principles in view, which ought to be considered.

The society may fix and record a judgment already existing as a consensus of opinion of its members; first, as to a principle dictated by good taste; second, as to a principle dictated by policy; or, third, as to a particular usage.

I understand that it is the office of the committee to select the matter that should be acted upon by the society, collect the data bearing upon each point and present such points and related data to the society.

One naturally feels a resentment when he is addressed in words he cannot understand. There is hardly any explanation that is creditable to both parties.

Toward the engineering profession the public is generous but ignorant. Knowledge should not be obstructed. Over 465 names for ninety-three parts of an ordinary engine lathe do not seem to invite a public acquaintance with that device.

A man must know more than his own profession or he will not know that. The curse of the Tower of Babel should be mitigated, not increased.

The word "carbureter" has been spelled in half a dozen different ways by good authority, and even now we can find it spelled in two ways, although the Standard Dictionary marks one as falling into disuse.

Shall we say "Jack-in-the-Box," "Balance Gear," "Equalising Gear," "Compensating Gear," "Differential Gear," or simply "Differential?" (The U. S. Patent Office says we should say *gearing* and not *gear* in this connection.)

Shall we say "Drip Pan," "Under Pan," "Shield," "Under Protection," "Dust Guard," "Dust Pan," "Mud Pan," "Sod Pan," "Grease Pan," or "Guard?" ("Dust Guard" and "Under Pan" are used by the U. S. Patent Office.)

Shall we say "Fender," "Wheelguard," "Mud Guard," or "Wing," and if we use "Mud Guard" shall we not be in danger of confusion with "Mud Pan," and if we use "Fender" shall we not be in danger of confusion with two or three other devices that are properly so called.

Besides what shall we do with the approximately vertical parts between the frame and running-board or wheelguards?

SYNONYMS

To the rule that two words for the same thing cannot long exist, a seeming exception is recognized in words expressing a different point of view or shade of meaning. Thus it would seem that "Equalising Gear" well expresses the mechanism that equalizes the power of the engine between the two driving-wheels; or "Differential" the mechanism that permits a differential motion of such wheels. So it is conceivable that one term might accurately and clearly indicate a part from an engineering point of view, and another better express the generous enthusiasm of the amateur.

DERIVATIONS

In general literature words have been derived from the ancient languages by the learned who had sufficient prestige to enforce them. To the learned such words expressed a meaning due to their derivation and their derivation has had an effect even in their popular use, which, however, more and more departs from the original usage until often it is quite lost and the derivation forgotten.

In this art words are formed from our own language and therefore carry with them the meaning due to their derivation. The word "caterpillar" does not suggest usually to us a "hairy cat" or an efficient forager, but a "caterpillar-gear" is always suggestive, and to my mind not very happily so.

It was a barbarous age that pictured Vulcan acting as cupbearer to the gods as a droll figure limping from couch to couch while the hall echoed with the laughter of the assembled gods; and it was an abnormal imagination, unable to appreciate the beauty of reality, that personified the sciences as a powerful dwarf that made small what was great and magnified what was small; simply an illustration of the truth that comparisons are relative.

I am fain to admit that I like the smell and grime of the shop, where it is necessary, and the I like the smell of the laboratory, even the sulphuretted hydrogen and nitric oxide, when necessary, but I believe in proper ventilating hoods. Even if there is romance to us in these incidentals, this is not a sufficient reason for imposing them on our indulgent friends. It is not necessary that our nomenclature should carry with it the atmosphere of the shop.

A name in engineering should express the function of the object. The intention in the drivation of words is always to make the term descriptive, even when metaphor is used. The clearer and more definite the description the better.

Report of Commercial Car Wheels Division

(Formerly Wheel Dimensions and Fastenings for Tires Division.)

S. A. E. STANDARD MOTOR TRUCK WHEEL—EDGES OF PERMANENT METAL FELLOE BAND

We recommend that the permanent metal felloe band be rounded on the two outside edges with radius not to exceed 1-16 inch, and that one inside edge of the band have an angle of about 45 degrees, extending about 1-16 inch from the edge.

We further recommend that the previous recommendations as to tolerance in width of permanent metal felloe band be modified to read as follows:

	Plus	Minus
Tolerance in width	1-64 inch	1-64 inch

And, in consequence of the last-mentioned recommendation, that the previous recommendation as to trueness of band when placed on surface plate be modified to read as follows:

Either side of the band when laid on a surface plate must not clear more than 1-64 inch at any point.

TOLERANCE IN CIRCUMFERENCE OF PERMANENT METAL FELLOE BAND

In June, 1911, the division voted that the tolerance in circumference should be:

	Plus	Minus
Before application to wheel	1-16 inch	0
After application to wheel	1-8 inch	0

In February, 1912, the division, in view of the then more extensive manufacture of a rigid-base tires, recommended that the circumferential tolerance should be:

	Plus	Minus
Before application to wheel	1-32 inch	1-32 inch
After application to wheel	1-16 inch	1-32 inch

Both of these recommendations were accepted by the society, the latter, of course, superseding the former after a long discussion, it was:

Voted that the last-mentioned above tolerance in circumference of permanent metal felloe band should be modified to read:

	Plus	Minus
Before application to wheel	0	1-16 inch
After application to wheel	1-16 inch	1-32 inch

MEASURING CIRCUMFERENCE OF BANDS

In measuring circumference of the band, if there is no allowance on the tapeline itself, a correction amounting to three times the thickness of the tapeline should be made.

Below is given a statement summarizing the recommendations made in all (including the above, the fourth) the reports of the Wheel Dimensions and Fastenings for Tires Division; in other words, a complete statement of the matter contained in the three reports already accepted by the society, and representing a complete data sheet on the subject, if the recommendations contained in the above given report are accepted by the society.

Wheel Dimensions for Solid Tires

Demountable and Non-Demountable Rims

Single Tires

Width of felloe and band.....⅝ inch less than sectional size of tire.
Thickness of steel band.....¼ inch up to 4½ inch tire; ⅜ inch on 4½ inch and larger tires.

Dual Tires

Width of felloe and band....Twice the sectional size of tire.
Thickness of steel band.....⅜ inch for all sizes of tire.

Single and Dual Tires

Sectional size of tire	2	2½	3	3½	4
Minimum felloe thickness	1¼	1¼	1½	1½	1⅝
Sectional size of tire	4½	5	5½	6	6½ and over
Minimum felloe thickness	1¾	2	2	2	2⅛

The Development of the Wire Wheel

From the Paper Read Before the S.A.E. and I.A.E. by George W. Houk

IN presenting his paper on wire wheels, G. W. Houk explained that he was not attempting to discuss the subject from an engineering standpoint but wished to give the history of this type of wheel as he has found it here and abroad. The paper follows:

The object of this paper is to give a brief history of the wire wheel as developed in England and its adaptation to the American automobile for American roads.

Being associated with the motor industry abroad from its inception, I came to America in 1909 to follow the same vocation. Being in a position to draw comparisons between the American and foreign built cars, my attention was first drawn to the enormous tire expense when American road conditions were much in favor of the tire as compared with English and French roads, by reason of the hard and flinty surfaces of the foreign roads compared with the soft springy conditions of the American roads. Rarely I found a tire worn out—in most cases it was a rupture, caused by a blow. thus weakening the fabric of the tire, resulting in a blow-out. Abroad a tire is usually worn down to the last layer of fabric before giving way.

I then began to carefully study the unsprung weights of American cars compared with foreign cars. I found the greatest difference lay in the wheel equipment. I returned to England to find that wire wheels were attracting attention through their merit over wood wheels as tire savers, coupled with their great strength to resist side slips and the ease with which you could charge a deflated tire to an inflated one by carrying a spare wheel.

Having known the firm of Rudge-Whitworth, Ltd., of Coventry, for a number of years as a builder of wire wheels, I found it began in 1905 by making a set of fixed wire wheels for a 90-h. p. Napier racing car, these wheels embodying its well-known principle of dishing the wheels; that is, making the outer set of spokes very much coned, the innet set nearly straight and so arranging the tangent that the inner spokes took nearly all the drive. These wheels first proved their efficiency in the Gordon-Bennett trials in Ireland.

In 1906 Clifford Erpe at Ormonde Beach drove the last 60 miles of the 100-mile race with one rear tire and nine spokes missing at an average speed of 99 miles per hour, winning the race. Having found the construction efficient for resisting lateral strains, caused by skidding around corners under high speeds, early in 1906 the company began to manufacture and commercialize the detachable wire wheel. In the hands of the public much useful information was obtained by careful attention to the smallest details during a period of 3 years.

As the wheel business became a factor in the trade many arguments arose as to the superiority of wire over the wood, or artillery type, of wheel. A series of tests was carried out at the laboratories of the Rudge-Whitworth company. The method of testing was by steady pulls to find out the lateral as well as the vertical strain. These showed such overwhelming superiority of wire over wood wheels that makers of wood wheels denounced this method of testing, saying it did not represent anything like the actual conditions to which a wheel was subjected while on a car. So the impact test was suggested by J. H. Lester, a serious student of automobile technology. Until the first series of impact tests were completed it was expected that the intense lateral rigidity of the wire wheel would show worse results than the wood wheel with its elastic yield. This proved quite the contrary, wire wheels showing up much better

Wheel Diameter Over Steel Band

Single and Dual Tires

Nom. outer diam. of tires.....	30	32	34	36	38	40	42
Wheel diam. over steel band..	24	26	28	30	32	34	36

Exact circumf. over steel band; neglecting tolerance

75 25/64 81 11/16 87 31/32 94¼ 100 17/32 106 13/16 113 3/32

Allowable Deviation from Precision in Felloe Bands

	Plus	Minus
Tolerance in circumf. of band before application....	0	1-16 inch
Tolerance in circumf. of band after application....	1-16 inch	1-32 inch
Tolerance in width of band.....	1-64 inch	1-64 inch
Tolerance of thickness of band.....	0.006 inch	0.006 inch
Tolerance in radius of band after application.....	1-16 inch	1-16 inch

Circumferential deviation from precise figure must be uniform across entire width of band.

Radial deviations must not occur at diametrically opposite points, and there must be no flat spots or kinks in band on finished wheel. Either side of band when laid on a surface plate must not clear more than 1-64 inch at any point.

Bolt Equipment for Side Flanges

All bolts to be ⅜ inch diameter

Outside Diam. bolt diam. tire hole circle	Number of bolts	Outside Diam. bolt diam. tire hole circle	Number of bolts
26..... 18½	6, 9 or 18	42..... 34½	10, 15 or 30
28..... 20½	do.	44..... 36½	12, 18 or 36
30..... 22½	do.	46..... 38½	do.
32..... 24½	8, 12 or 24	48..... 40½	do.
34..... 26½	do.	50..... 42½	14, 21 or 42
36..... 28½	do.	52..... 44½	do.
38..... 30½	10, 15 or 30	54..... 46½	do.
40..... 32½	do.		

Edges of Felloe Band

Band to be rounded on the two outside edges with radius not to exceed 1-16 inch, and one inside edge to have an angle of about 45 degrees, extending about 1-16 inch from the edge.

Measuring Circumference of Band

In measuring circumference of band, if there is not an allowance on the tapeline itself, a correction amounting to three times the thickness of the tapeline should be made.. Note—*All of the foregoing summary, so far as pertinent, applies to metal wheels.*

Bearings Data Not Yet Complete

On the recommendation of its chairman, David Fergusson, the fourth report of the Ball and Roller Bearings Division, was referred back to the society without discussion. Mr. Fergusson pointed out that the data at hand were not completed by any means and that the division has been trying for 3 years to collect the data for the limits of tolerances to be specified. The division desires to get all the manufacturers of these products together in order to fix these, but so far has been put off by them. It was suggested that the report of this division which is to be presented at the next winter meeting be a final report, for in this way the manufacturers could no longer put the society off on the matter, as Mr. Birdsall put it.

Chairman W. P. Kennedy was not prepared to submit its report as there is a large amount of research work to be done on account of the rapid progress of the truck industry and the widely-varying designs and practice. It will report at the next meeting.

The fifth report of the Broaches Division was submitted by its chairman, C. W. Spicer. It contains tables of specifications for six and ten-spline shafts. This report was referred back to the committee for further consideration of the proportions for multiple-splined shafts.

Progress on Passenger Car Wheels

The Passenger Car Wheels Division, which was formed at the last winter meeting of the society and which held a meeting with the rim makers in Cleveland in the earlier part of the year, reported progress. It has found the need of data as to the strength of rims. The weight and material of which rims are made are coming more to the attention of the division. In order to obtain data as to the strength necessary for the rims, two rubber companies came forward at the meeting and volunteered to test the force exerted by the tires by blowing them up until they burst. The figures thus gathered will give the committee something to work on.

As a further evidence of the progress of the division, it was stated by Chairman Henry Souther that already several makes of demountable rims have been so modified that they will all go on the same felloe bands.

No report of the Motor Testing Division was presented by Chairman John O. Heinze, although progress is being made. Before making another report the division wished to get the views expressed by the visiting Britons as to testing methods in order than any valuable suggestions might be incorporated in the next report.

George W. Houk, who read the interesting paper on wire wheels

than the first-class wood wheels. When weight was taken into account the wire wheel's superiority was incontestable.

A number of members of the American Society of Automobile Engineers were present at the Rudge-Whitworth works in Coventry in November, 1911. The test carried out at that time was on an English artillery wheel, made from oak. Results were so overwhelmingly in favor of the wire wheel that some of the members did not feel that the English artillery wheel was as strong made of oak as the American wheel made of hickory.

Rudge-Whitworth procured the best American hickory wheel, made by one of the most reputable makers in this country. Both wheels being 34 by 4.5, with tire inflated to 80 pounds pressure; the wire wheel complete with inner hub weighed 92.25 pounds; the wood wheel 136.25 pounds. The pendulum bob weighed 450 pounds. The pendulum bob was pulled back at different distances up to 6 feet and released.

An equal number of blows were struck, resulting in the complete destruction of the wood wheel, while the wire wheel was still in condition to be used.

Wire Wheels Are Savers of Tires

Wire wheels show a great saving in tires. Many claims are made why this is so. Taking them in the order they would appear to the layman they are:

First—Weight: A 36 by 4.5 R. W. wire wheel with Houk Q. D. rim, weighs 57.25 pounds, inclusive of inner hub, the hub weighing 23.25 pounds, spokes 5 pounds, rim and nipples 29 pounds. The same size American hickory wheel with demountable rim weighs 101.25 pounds, wood felloe, 5 pounds; spokes, 9 pounds; felloe band, 21 pounds; rim, 36.5 pounds; wedges and nuts, 7 pounds; hub, 22.75 pounds. Therefore, the excess weight of the wood wheel as compared with the wire wheel is found at the periphery of the wheel.

This may be said to have a very serious effect on tires; in addition, the double thickness of felloe band and rim, backed by the wood felloe, retains the heat, so detrimental to tires, while the seventy spokes and naked rim of the wire wheel radiate the heat.

Second—Resiliency: That is, resiliency in the direction in which the load is carried; it may be said to relieve the strain on the tires, both in starting and stopping.

Actual figures showing tire saving are very difficult to obtain, as pneumatic tires are extremely variable in their performances. However, we have a concrete example in the Daimler company's hiring department in London. Fifty tires were tested on wood wheel and fifty tires on wire wheels, attached to identically the same cars. The wood wheels traveled 102,524 miles, an average of 2,050 miles per tire. The wire wheels traveled 172,731 miles, an average of 3,454 miles per tire. This clearly shows an increased mileage of over 70 per cent., or what is equivalent to a reduction in your tire bill of 40 per cent.

The growth in the use of wire wheels in Europe for both pleasure and racing cars is proof conclusive that the wire wheel has come to stay. From the day of the Gordon-Bennett trials in Ireland, to the ruling out of detachable wheel cars by the Grand Prix authorities because of an undue advantage thereby enjoyed, to the subsequent Grand Prix race, in which thirty-one out of thirty-six cars were detachable wire wheel equipped, to the present day when more than 60 per cent. of all Europe and British production of motor cars is detachable wire wheel equipped to the conditions here in the United States to-day, when leading makers of motor cars are offering as optional causing spokes to break and loosen and the wire wheel to be brought into disrepute.

The fundamental reasons for this sure and steady progress may be stated as follows:

1—Saving of weight.
2—Increased safety.
3—Increased tire life.
4—Better riding qualities.
5—Improved appearance.
6—Growing scarcity of suitable wood.

First-class wire wheels, owing to their construction, which not only embodies the most careful selection of materials as well as the highest grade workmanship, cost at the present time from one-third to one-half more than the best wood wheels. Starting with the inner hub, machined from a solid steel bar or a drop forging, it must be accurately machined to take the bearings, as well as to be interchangeable with all five wheels, so that they may be easily detached and attached without allowing the slightest bit of play to cause squeaking or chucking, so common in most demountable rims.

Further than this, we have a great variety of axles in this country, and to produce an inner hub capable of adapting itself to the fixed axle, as well as the floating type with the driving dog requiring at least a 5-inch inside diameter, it was necessary for the company to produce a hub suitable for the smallest to the largest diameter axles, ranging from 2.75 to 5.5 inches, and at the same time to be interchangeable, as well as secure by a locking device that would permit of readily detaching as well as attaching the wheel to the hub. In most practices of attaching the outer shell to the inner hub it was accomplished by a fixed locking device, usually on the order of ratchets and springs. This fixed locking device did not find favor in the hands of the public because the serrations were liable to wear as well as because of the accumulation of dirt and the failure of springs.

This resulted in giving great attention to the development and perfection of the automatic locking device, which in spite of neglect on the part of the chauffeur would not cause harm or trouble.

The 1913 locking device consists of a threaded lock ring with a v-shaped groove. This groove locks on the outer end of the hub. When this nut is slack the pressure on the groove face occurs at a point, by reason of the outer shell being larger than the inner hub. Therefore, the weight of the car produces an eccentric differential creep, whereby the nut lags and so tightens itself against the hub shell. When perfectly tight the nut is concentric with hub shell and creep ceases.

This feature might be more easily explained by taking the opposite view of the nut on a buggy wheel, wherein a left hand nut is fitted to the left hand side of the buggy and a right hand nut to the right hand side; more easily understood by the well-known fact of a ball or roller traveling the reverse way in which the object it carries is going.

Wire spokes were extensively used in connection with the earlier stages of automobile construction with more or less success, but this was due largely to the light weights they had to carry. As the weight of the car increased, the general supposition was they should increase the thickness of the spoke. Experience proved that this theory was entirely wrong. The Lanchester company of Birmingham adopted a comparatively thin spoke of suitable material, but with careful thought given to the bend in the spoke, so that it would leave the hub shell and rim in such a manner that it would allow for elongation without causing the nipple heads to leave the seat of the rim, or the heads of the spokes to leave the seat of the hub shell when the wheel came in contact with an obstruction.

Many months of careful experimenting and road testing served to solve the problem, resulting in the Rudge-Whitworth triple-spoked wheel, which overcame the weakness of the side strains to which a wheel might be subjected in leaving a rut or crossing a car track. Special machinery had to be invented and perfected to depress the rims, as each size of hub shell and rim required a different angle. The same may be said of the bend of the spoke leaving the hub shell.

120 millimeter hub fitted to a 36 by 4.5 rim would require a different bend in the spoke as well as a different angle from

which the nipple seated into the rim, as compared with a 62 millimeter shell and a 36 by 4.5 rim.

We find to-day one or two advocates of the substitution of wire wheels for existing cars, now fitted with wood wheels, urging the local garage men to purchase hubs, rims, spokes and to assemble these to fit the job. This is bound to result in linking together the hub and rim at wrong angles, thereby causing spokes to break and loosen and the wire wheel to be brought into disrepute.

Marmon Opens Discussion

In opening the discussion, President Howard Marmon stated a fact which he had observed in connection with the recent 500-mile race at Indianapolis, and which he would like to have answered by an authority. Although the race was won on wire wheels, two of the teams changed over to wood wheels after practicing and before entering the race, the reason given being that the front wheels in rounding turns at speeds 80 miles an hour, knuckled under so as to interfere with the steering.

J. G. Vincent, Packard company, stated that in his opinion the demountable feature is the greatest advantage of the wire wheel. Next to this there is the tire saving, a wire-wheel-equipped touring car has 78 pounds less weight than with wood wheels, considering two spare tires for the latter and extra wheels in the former case. It is more difficult, however, to carry extra wheels than tires alone, which may be carried at the side. Mr. Vincent has found some difficulty in getting garages to wash the wire wheels except at extra cost. He did not agree with one of Mr. Houck's statements that wire wheels get through mud and mire easier, since he has found that the larger wood spokes give greater surface for traction in deep mud, the wire spokes filling up and giving the wheels the appearance of steel disk types, which then slip in the mud.

The finish coming off the wire spokes, thus allowing them to rust, is a serious disadvantage, according to Mr. Vincent. It is very hard to get the enamel to stay on, but the new process of coating them as touched upon by Mr. Houk may be an effective remedy. As to tire saving, he does not know what that will be yet, and as regards riding, he states that it is impossible to tell the difference between riding on wood or wire wheels.

F. E. Muscovics asked if there were any difference in the accelerating powers of the car equipped with wire wheels provided that the weights were nearly the same. Mr. Vincent replied that he had tried acceleration tests on both wire and wood wheel cars for the purposes of comparison, but got no results which showed a difference in favor of either one.

David Fergusson, stated that the Pierce-Arrow company had also run a series of tests lasting over 18 months in order to determine whether there was any advantage in this respect which could be credited to the wire wheel. He stated that no difference was found.

President Browne, of the I. A. E., stated that he had personal experience with the wire wheel and that he found a decided saving of tires in favor of the wire wheel. He said that, whereas he got about 5,000 miles out of a casing in connection with wire wheels, his mileage on the wood wheels amounted to only 3,500 miles. He stated that the cleaning trouble was not serious and that the enamel did not get knocked off ordinarily. His chauffeur at first disliked the idea of cleaning the wire wheels but soon learned to do it and it took him but little longer than necessary to clean the wood wheels.

Mr. Moscovics stated that he thought the difference in acceleration due to the use of wire wheels might be more noticeable in the lighter cars.

Mr. Hall remarked that as a tire maker his company had carried on a long series of experiments, but as yet could say nothing except that the results were much different than they had expected. This ambiguous statement was the cause of considerable mirth among the engineers present.

Humber to Abandon Wire Wheels

Mr. Benson of the English Humber Company made some remarks that were of the greatest interest, especially since his concern has been using the wire wheels for the past few seasons. He stated that the wire wheels were to be abandoned by his concern and that the 1914 Humber cars would be equipped with artillery wheels of hollow steel construction. He stated that this determination was reached after circularizing the dealers. He stated that out of 150 who had received the letters asking their opinion on the wheel question, 140 replied in favor of abandoning the wire type. The arguments against the wire wheel as used by the dealers were difficulties of cleaning and rusting between the valve hole and rim. Mr. Benson stated that he did not think there was any difference in the accelerating qualities in favor of either type of wheel.

President Marmon asked Mr. Benson if his company would use the demountable type of rim. He replied that his company would use an entirely different wheel of detachable type.

Mr. Clarkson, of the I. A. E., asked Mr. Houk regarding the Sherardizing and other processes for preventing the wire spokes from rusting to which Mr. Houk replied that he was not using the process.

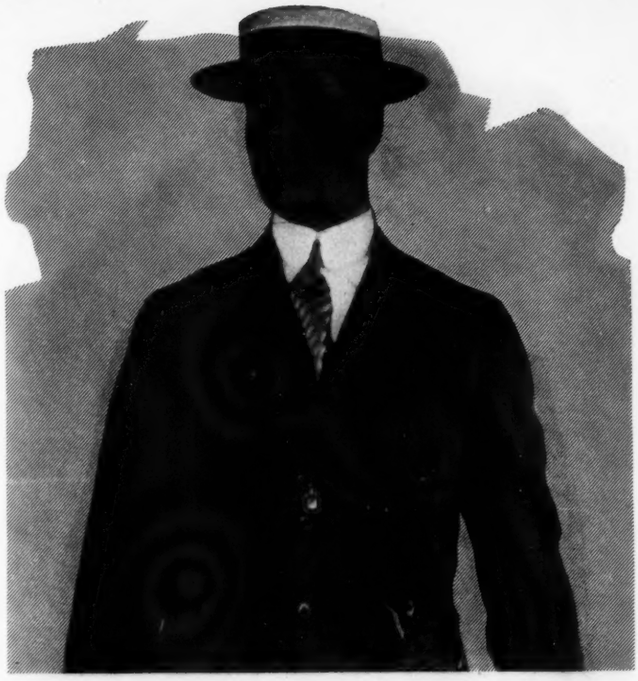
Mr. Mott stated that it was his belief that the weight of the wheel depended to a very large extent on the type of rim that was being used. He stated that with some types of rim the wire wheel would be heavier than the wood wheel; or, conversely, that the artillery wheel with certain types of artillery wheel rim would make that wheel lighter than some of the standard types of wire wheels.

Mr. Wheeler stated that rust was not of much importance if the operator knew the processes for rendering the wheel metal rust-proof. The entire matter, he said, could be expressed in the two words used by H. M. Leland, "knowing how."

Mr. Bennett, of the I. A. E., spoke on the decline of the wire wheel in England. He stated that it was gradually passing out. This year, he said, there were 20 per cent. less wire wheels sold than last year. In regard to the American tires he stated that he had noticed that the American tires blew out much more frequently than the English tire. He stated that this was due to the entrance of water through the aperture of the rims, thus rotting the fabrics. He stated further that he believed the wire-wheeled-car to be much more lively than the car using wood wheels. Mr. Bennett called attention to the Victor car tire test which was run in England some time ago wheen steel studded tires stood up well. His mention of the steel studded tire was caused by T. B. Browne stating that in his experience with the steel studded tire he did get a very good mileage.

W. G. Wall stated that in his opinion the entire question of the success of the wire wheel was one of initial design. He stated that the English engineer was working against different conditions than the American. He stated that the strength tests made on the wood wheel in England were made with a poor quality of hickory and that the good second-growth stock would have shown much better results than were obtained with the material tested out in England. A great drawback with the wire wheel as it now stands was stated by Mr. Wall to be the bad locks that are in use. He stated that he knew of one car where all four locks were broken just before the race at Indianapolis. On the whole, Mr. Wall is in favor of the wood wheel.

Henry Souther was then called upon by Mr. Marmon to close the discussion. He stated that at one time he held an absolutely unbiased opinion on wire wheels, but now since he had become interested in them that opinion had become decidedly biased in his favor of them. He liked them, he said, because of the ease in making a tire change. The rust problem is important, he admitted, but this could be easily brought under control by the use of the spare wheel which would allow a wheel that was threatened by rust to be taken off and enameled. The enameling work can be done in a short time, and it is easy and inexpensive.



P. W. Litchfield, who presented the important paper on tires

Pneumatic Tires

From Paper Read Before the S. A. E. and Visiting Engineers by P. W. Litchfield

THE manufacture of pneumatic tires, an industry less than 25 years old, has grown until at the present time the value of its product in the United States alone amounts to about $150,000,000 annually.

It has been the practice of automobile and vehicle builders for many years to make as nearly as possible the entire vehicle, but while the pneumatic tire is a component part of every vehicle, no manufacturer of bicycles, motorcycles or automobiles has ever successfully made his own tires, and the number of tire manufacturers has always been relatively very small compared with the volume of the industry.

If we go back to about the year 1890 and look at the means of transportation in vogue, we find that the hauling by self-propelled vehivles on land was confined to the railroads, two smooth parallel rails being carefully laid to form a perfect roadbed to protect the machinery of the locomotive sufficiently to make it a practical commercial proposition. The millions of ordinary roads throughout the country were used for hauling by means of domestic animals only.

At about this time the safety bicycle and rubber tire were developed. This brought to the attention of everyone the simplicity, speed and healthful exercise to be obtained by abandoning the horse and propelling the vehicle by man-power. While the horse could not call attention to the weaknesses of the vehicle which made his work harder and his progress slower, man, when he assumed the duties of the horse, began to analyze. Then began the study and development of the self-propelled vehicle industry of today.

Let us go back to the man on the bicycle. He soon found out that the solid tire was satisfactory on a smooth road, but when it came to a rough road he could feel the bumps and had to slow down, as the impact of the tire against stones and uneven surfaces was more than he could stand with comfort and more than he could propel the bicycle against with his own power for any length of time. Naturally, his next idea was to get more cushion. This resulted in the introduction of the cushion bicycle tire, which was an all-rubber tire with a hole in the center to allow for more distortion in the rubber itself, the cross-section diameter of the tire being increased from .75-inch to about 1.5 inches. The rider then found he had gained more cushion, but had increased the weight of his vehicle, so that it required more power to propel the bicycle on good roads. It was at this time that

J. B. Dunlop, inventor of the pneumatic tire, who took part in the discussion of Mr. Litchfield's paper

the pneumatic tire was invented to increase the cushion, decrease the weight and lessen the power consumption of the tire on ordinary roads. Since about 1893 the only tires which have been used on self-propelled vehicles are either solid rubber or pneumatic rubber tires; no other type seems at the present time likely to engage the serious attention of engineers.

As both of the above-named types are being used in larger quantities every day, let us (before passing to the pneumatic) analyze the difference between them and see under what conditions on seems to be superior to the other. This brings us to the question: In a self-propelled vehicle, what are the functions of the tire? They are, first, and foremost, a cushion to protect all parts of the vehicle from the shock caused by the impact against inequalities of the road; second, to provide proper traction, avoiding unnecessary slip. These are the two main functions, and, therefore, the principal thing to be kept in mind in tire design is to satisfactorily accomplish them at as low a cost per vehicle mile as possible, with the least possible consumption of power, and with the least amount of trouble and inconvenience to the driver and occupants. The pneumatic tire depends upon the elasticity or resiliency of a gas, *i. e.*, air, for its cushioning effect, while the solid tire depends upon the resiliency of a practically incompressible solid (*i. e.*, vulcanized rubber). It is needless to say that air is the more perfect cushion and the lighter and cheaper, the cost lying only in the air container. No other *solid* body can compete with india rubber in acting as a cushion by being greatly distorted and recovering its original shape again repeatedly with very little fatigue.

Vulcanized Rubber Is Incompressible

One point regarding rubber must be carefully borne in mind, which is, that vulcanized rubber is practically incompressible; its cushioning effect is only possible by distortion and recovery, and it must be allowed by the designer plenty of room for this action. A glance at hundreds of patents on solid-rubber tires shows that this point has been almost entirely ignored by inventors. Another point frequently overlooked is that the shock may come from almost any direction, owing to varying road surfaces, turning corners, running into curbstones, etc. Many tires and spring wheels carefully designed to take up blows acting directly from the ground vertically toward the rim are utterly unfit to withstand shocks in other directions.

Before selecting between the solid and pneumatic tire, the weight to be carried, the speed to be attained, and the character of the road must be considered. The load to be carried can be worked out satisfactorily on either type. In a solid tire it requires a sufficient amount of properly compounded rubber, and in a pneumatic a sufficient combination of air volume and pressure contained in a suitable retainer. The character of the road and the speed have a great deal to with the selection of type, as air being a much better cushion than rubber, allows the pneumatic to give much more efficient cushion and traction on rough roads and at higher speeds than is possible for the solid. As far as the efficiency of the vehicle is concerned, the pneumatic would nearly always be chosen as the ideal tire were it not for the fact that in many cases the roads are sufficiently good and the necessary speed sufficiently slow to make the saving in cost per mile on solid tires, due to their longer life, offset the increased efficiency of the pneumatic. Again, the unreliability of the pneumatic due to injury through punctures or blowouts, making attention to it necessary at awkward places and times, often causes the selection of solid tires, as frequently occurs on pleasure electrics for ladies, fire apparatus, mail wagons, etc. In short, good roads and slow speeds are favorable conditions for solid tires; ordinary roads and high speeds for pneumatic tires. The solid tire having less cushion and less motion requires a lower percentage of pure rubber in its composition than the pneumatic, which tends to lower tire mileage cost.

Three Types of Pneumatics

To go back again to the man on the bicycle. His experience with solid and cushion tires resulted in the invention of three types of pneumatic tires at almost the same time, and these three have been the only ones that have been, or are now, used in any quantities. They are the single-tube, invented by Tillinghast; the clincher, invented by Bartlett, and the wired-on, invented by Dunlop. There was great rivalry between the thre types for 2 or 3 years, resulting in the supremacy of the single-tube in the United States and the clincher and wired-on types in all other parts of the world. The introduction of quick-repair cements, of single-tube repair shops all over the country, and lower cost of production were largely responsible for the success of the single-tube in this country. The wired-on type is still the most popular in other countries.

Following the pneumatic bicycle tire came the pneumatic carriage tire, and each country developed the type of tire found most popular on bicycles. This was a temporary business, however, because the tires were used on horse-drawn vehicles, they did not have to perform the traction or driving functions, and the speed of the horse was so slow that a sufficient amount of cushion could be obtained from solid tires and metal springs without the annoyance of punctures; hence this type of tire gradually gave way to the solid.

Following the pneumatic-tired carriage, about the year 1898, came the automobile with its delicate mechanism and high speed, and with it the demand for a more durable and efficient pneumatic tire. As in the case of the carriage, each country still further developed the type of tire which was most popular and successful on bicycles. American designers went ahead with the single-tube, making it up to 5 inches in size, while England developed the wired-on, and France the clincher, (the clincher was also being made by G. & J. and Goodrich in the United States). It did not take very long, however, to discover that conditions were quite different on the automobile from what they were on the bicycle, and the French clincher tire made by Michelin and others soon had all the other types "on the run," and English and American tires were at a discount. The wired-on type, which proved so successful on English bicycles, disappeared in the large sizes, because the one-piece Dunlop rim, which was so easy to fit with an inextensible-edge tire in small cross-sections, was almost an impossibility in large sizes. The single-tube American tire when made of a size and thickness necessary for an automobile could be repaired only at great expense and at a well-equipped repair shop. Roadside repairs were impossible. The clincher type soft bead tire was the only practical one of the three for an automobile, and soon became the standard of the world and was made in all countries. The weaknesses of this type of tire which developed were principally the difficulty of forcing the tire (in the large sizes) over the one-piece clincher rim; the necessity for several tire bolts to keep it from creeping on the rim, owing to the stretching of the bead; its depending entirely upon air pressure to hold it on properly; and when overloaded, or much underinflated, rim-cutting, and if run wholly deflated, destruction in a very short time. To overcome these difficulties several mechanically fastened side-flange and bolted-on type tires were introduced, but they required special wheels, special widths and diameters of felloe, were more expensive, and, with the exception of the Fisk bolted-on type, did not make much headway against the standardized clincher tire. The Clincher Automobile Tire Manufacturers' Association had wisely standardized the clincher rim dimensions and insisted on carefully inspecting all rims manufactured, saving the automobile owners and tire manufacturers hundreds of thousands of dollars, which would have been lost if the unstandardized condition, similar to that which now exists in Europe, had not been remedied.

During 5 years, from 1900 to 1905, the clincher tire was perfected and standardized. It seemed that it would have no competitor, but the last-named year brought out the invention of two quick detachable rims, the Dunlop and the Goodyear. They were

developed to a point that they would fit the same wheels as the clincher rim, and by reversible rings, take either the clincher type of tire or the wire-bead type. These rims overcame, first, the difficulty of stretching the tire over the clincher rim, which was so difficult in large sizes; second, with the removable side ring the tire could be made with an inextensible bead, making it free from creeping by the use of only one bolt on the valve stem, instead of several at intervals around the tire; third, the beads being always against the rim, the inner tube was not so liable to be ruined, in case of puncture, by getting under the beads, and, fourth, a wired-on type could be used with the flanges turned outward, instead of hooked in, making rim injury to the tire less likely in case of overloading or underinflation. The flared-out side ring also made it easier to mount and remove the tire from the rim. This quick detachable type of rim became, a year or two later, the American standard and the wire-bead type of tire began to grow steadily in popularity.

The introduction of this wire-bead straight-side tire met with considerable opposition from the manufacturers of clincher tires, and in meeting it they introduced the quick detachable clincher type.

Vulcanization

I would now like to discuss some of the differences between the principal pneumatic tires now in the market. Let us first take up the subject of vulcanization. Vulcanization is the chemical change which is caused by the action of heat and time upon the mixture of rubber and its chemical compounding ingredients, transforming it from a plastic dough to a resilient and reacting solid. In order to get a properly vulcanized tire extreme care must be used as to the materials used in compounding, in regard to both quality and amount, and also as to time, temperature and conditions under which the vulcanization takes place. A tire revolving constantly along the road, carrying the weight of the car, and each moment changing its shape and recovering, generates a great deal of heat. This action of heat carried on for a considerable time has a tendency toward affecting the vulcanization. Therefore, all high-grade guaranteed tires are usually compounded so that they take a very long time to vulcanize. This increases the cost of manufacture. Many unguaranteed tires are so compounded that they vulcanize quickly, saving from one-half to three-quarters of this time, in order to cut down the cost, but the heat generated along the road tends to overvulcanize these tires and they are apt to separate and blow out after a much shorter mileage on this account.

Another difference in pneumatic tires is in the style of fabric used, there being two distinct types upon the market, the close-woven fabric tire and the cord tire. Nearly all tires are of the close-woven fabric type as they are more durable, easier to repair in case of injury, and can be operated at a much lower cost per mile.

The next point to consider is the size of the tire. In the pneumatic tire the load is carried by an air cushion, and the amount of the load carried depends upon the combination of the volume and pressure of air used. For a given weight of car it follows, therefore, that the larger the volume of air in the tires the less inflation pressure required, while the smaller the tire the greater the inflation pressure necessary to carry the load. Tires should be large enough to carry the load with very little flattening of the tire, say not over 14 per cent. of the sectional diameter at an inflation pressure which will give sufficient cushion to the vehicle.

The use of tire fillers is another question which has commanded the attention of automobilists, owing to the extensive advertising carried on by tire filler companies during the past year. A pneumatic tire casing is designed for use with compressed air; when it receives a blow or shock from an obstruction in the road, the blow is distributed all over the casing, owing to the support of the perfectly fluid air-cushion behind it, the tire absorbing the blow, turning it aside, with very little injury to the casing, except in very severe instances. When a filler is used, the blow is localized in the immediate proximity of the point at which it is received, and the strain falls in one place, thereby weakening the tire. Constant repetition of these blows causes the casing to gradually disintegrate and wear out. The fillers add considerably to the weight of the car, require a great deal more power to drive the car, and do not absorb the shocks to nearly the same extent as is the case of air.

Before closing I would like to touch upon the subject of rims for pneumatic tires, as it is of the greatest importance to the tire that it be fixed upon a properly designed rim. With clincher tires especially the exact contour of the hooks is of great importance, as it takes only a very little variation from the standard to completely ruin the tire. The proper design for the width between clinches on a clincher tire has been standardized at 60 per cent. of the nominal cross-section of the tire. It is the writer's opinion that the proper dimension for the width at the heel of the bead for the straight-side wired-on tire is 66.7 per cent. of the nominal cross-section of the tire, flaring outward from the heel of the bead. The less the required flexing of the casing when the tire is overloaded or insufficiently inflated, and the larger the supporting surface given by the rim to the tire where the flexing occurs, the less the tendency toward rim-cutting. The ideal rim would give continuous support to the tire, especially where the tire leaves the rim on the sides. Split and open side rings should be avoided as far as possible. When split rims are used, it is also absolutely necessary that they be in perfect alignment.

Arthur J. Slade, who brought out some interesting points in the discussion on tire efficiency

Discussed with Applause

After Mr. Litchfield had read his paper, President Marmon stated that it was very fitting that on this occasion Mr. Dunlop, the inventor of the pneumatic tire, who accompanied the party, should say something on how he came to invent the tire. Mr. Dunlop rose amid great applause to address the interested audience. He said:

"Mr. Chairman and Gentlemen: I esteem it a great honor to be called upon to speak on this subject. Many misstatements have been made in relation to the invention of the pneumatic tire but as we say in Ireland, 'only one-half the lies that we hear going around are true.'

"I have always given great attention to the subject of traction and especially to road traction. I have always wanted something that would flatten out under the weight of the car in order to reduce the unit pressure on the part of the tire that is on the ground by increasing the area of contact. I first thought of flexible steel.

"A good many people have asked me what made me think of the pneumatic tire. I am only surprised that I did not think of it sooner."

Mr. Dunlop then went on to tell some of the details of manufacture of the earliest forms of his tire which was first patented in July, 1888. He stated that everyone knew that speed depends on resiliency, but strange to say the slowest tire that was ever made was the most resilient.

"Radial elasticity is necessary," stated Mr. Dunlop. "The pneumatic tire, although resilient, is rigid both in a circumferential and axial direction. If you take a piece of solid rubber and stand on it, it will flatten out, the sides will be widened and then when the load is removed they will creep back to normal. There is always a lump in front of a solid rubber tire just ahead of the axle center line. This is especially so in ascending a hill. This condition is not true of the pneumatic tire."

When Mr. Dunlop first proposed to make a broad tire that would be fast people said it was absurd as the fast tires of that time for bicycle work were about the thickness of the little finger.

When pneumatic tires were first manufactured, people used cloth cut on the bias for casings, but it was found that after a time the threads cut each other. The material used at that time was linen.

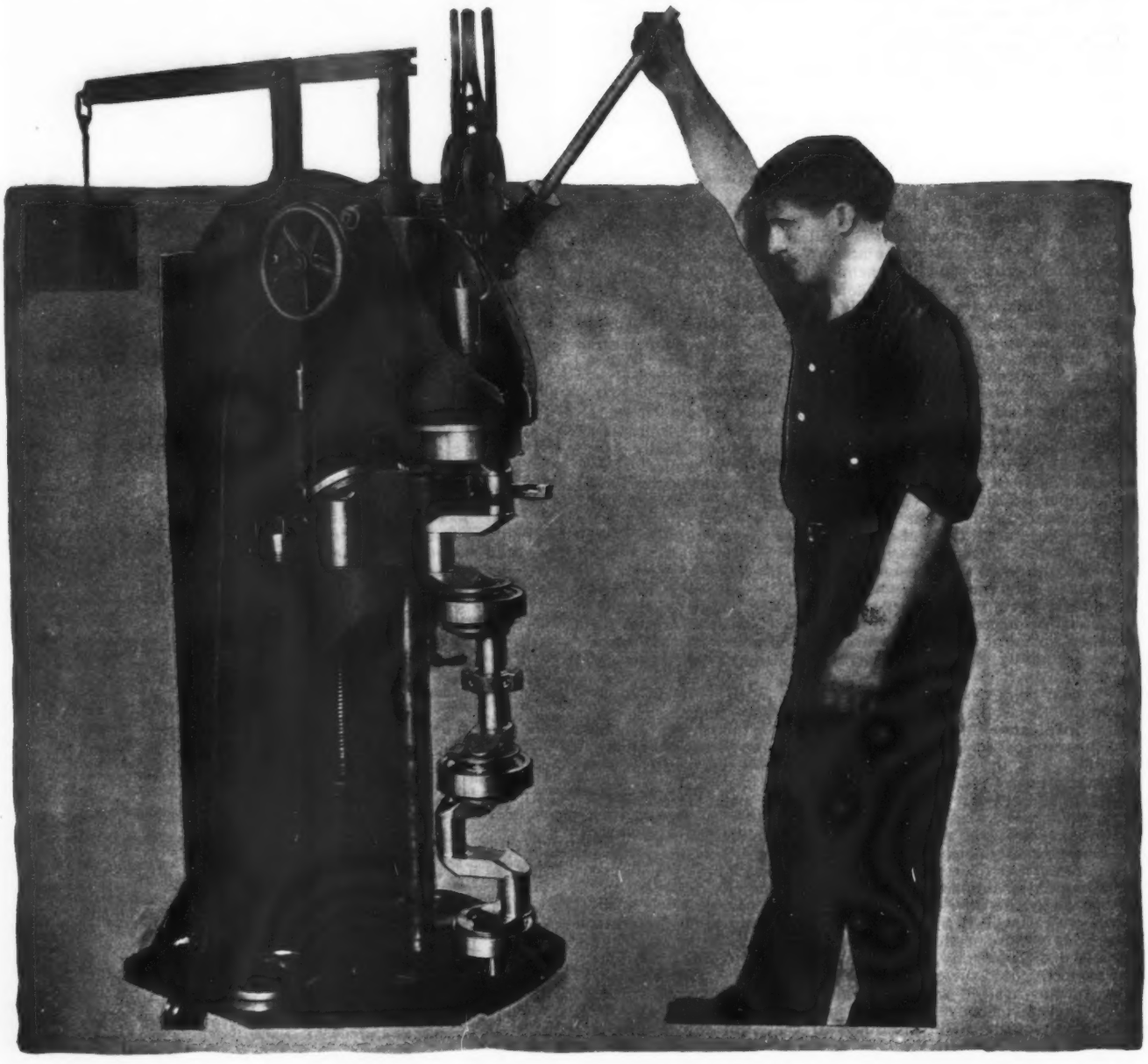
The first tire was made by making disks from a piece of wood cut off a plank and then wrapping the rubber which was secured in strips around the disks. To pump up the tires a football pump was used in connection with a piece of rubber hose from a nursing bottle. The tire tube although built up out of strips of 1-32-inch sheet rubber cemented together was air-tight. This thickness of rubber is still used in inner tube work. The first tire was built February 28, 1888. It was tried out in the moonlight and that night there was a partial eclipse of the moon.

A. J. Slade asked Mr. Litchfield if he were familiar with the different efficiencies of pneumatics, filled and solid tires at different speeds, to which the latter replied that he had no full set of figures although he had valuable data compiled from a long series of experiments. Mr. Slade remarked that he had noticed data sheets in the S. A. E. handbook which did not seem to be exhaustive or up-to-date.

C. H. Taylor asked if the cord tire were any more apt to have sidewall blowouts than any of the other types, to which Mr. Littlefield replied that he believed there was no difference.

Charles Wheeler, of the I. A. E., called attention to that part of Mr. Litchfield's paper which deals with fabric, and pointed out that while the cord tire is a speedier tire and makes for easier riding, it is more difficult to repair and in practice does not work out at as economical cost per mile as the close-woven type. Mr. Wheeler questioned this from the standpoint of the European countries where fuel runs up to 40 and 50 cents per gallon. He wondered from which viewpoint Mr. Litchfield's conclusion had been made.

Factory Miscellany



Special machine used for pressing ball bearings on Lozier crankshafts in the factory of the company, Detroit, Mich.

THE above illustration depicts the operation of pressing ball bearings on a Lozier crankshaft in the factory of the Lozier Motor Car Co., Detroit, Mich. Four annular ball bearings are used and the greatest accuracy is essential in pressing them on the shaft, but .0006 of an inch variation being allowed in the fit of the bearings. The special machine shown exerts a pressure of approximately 1 ton. The ball bearings on the center of the crankshaft are slipped over the crank cheeks, the inner race being large enough to permit of this. A split collar is pressed in between the shaft and bearing with the bearing against one of the crank cheeks. The bearing and collar are then pressed together to the center of the journal and a spacing collar is inserted on each side of the bearing. The rear bearing is put on first and then the others are put on in succession toward the front end. It takes 2 hours to assemble the crankshaft, it passing through only two hands in the process of assembling. The weight of the finished crankshaft complete with bearings is 140 pounds. It would be a very difficult task to press these bearings on the crankshafts without the aid of the special machine which also effects a considerable saving of labor, time and money.

DYNETO'S Four Story Building—The Dyneto recently erected a new factory at Syracuse, N. Y. It is a four-story brick building, with the boiler and engine room in a separate building. The building has a floor space of 30,000 square feet. It is equipped with new machinery throughout and is devoted entirely to the manufacture of electric starting and lighting systems. The capacity is 100 Entz electric starting and lighting systems and 200 Dyneto lighting systems per day.

Miami Plant in Indianapolis—The Miami Cycle & Mfg. Co., Middletown, O., is having a new plant erected at Indianapolis, Ind. The company makes motorcycles and accessories.

Mais Truck Plant Burns—Fire which burned itself out when fire-fighters were helpless for lack of water did $90,000 damages to the plant of the Mais Motor Truck Co., Indianapolis, Ind., recently.

Chicago Firm Moves—The Auto Sheet Metal Works, Chicago, Ill., recently moved into larger quarters at 1532 Michigan avenue, where it has a floor space of approximately 10,000 square feet.

Firestone Adds Four-Story Plant—The Firestone Tire & Rubber Co., Akron, O., has given out plans for the construction of a four-story brick, steel and reinforced concrete manufacturing plant addition.

Anguish Plant in Detroit—The Anguish Mfg. Co., Detroit, Mich., recently incorporated to manufacture metal stampings and automobile radiators, has acquired the plant and machinery of the Farlinger Mfg. Co., 1506 Fort St., that city.

Schram Automobile Plant—A plant for the manufacture of a new automobile to be named the Schram, will be established near Seattle, Wash., in the near future. A company for the manufacture of this machine was recently incorporated at $500,000 by F. J. Carvery.

Ready for Occupancy—The Cleveland Hardware Co., Cleveland, O., has completed its six-story addition and is ready for the installation of machinery. The company manufactures forgings and automobile parts.

Beulah Automobile Manufacturing City—W. W. Bennett, a wealthy Detroit, Mich., automobile manufacturer, has bought the orphanage colony town at Beulah, Tenn., near Nashville and will establish a new automobile manufacturing city.

Winton Workers Get Increase—The Winton Automobile Co., Cleveland, O., has granted an increase of 10 per cent to all its employees, numbering about 1,100. The reason for this increase is because of the fact that there are a considerable number of the employees members of the Automobile Workers' Union.

East Palestine Wants Rubber Plant—The Board of Trade of East Palestine, O., was voted unanimous support in its endeavor to secure a new rubber plant for that city. C. J. Davis and a few associates propose to build and operate a rubber tire manufacturing plant, 50 by 200 feet and two stories high.

Mogul Moves to St. Louis—A long lease that brings a new enterprise to St. Louis, Mo., was recently closed. The newcomer is the Mogul Motor Truck Co., Chicago, Ill. The lease covers the one-story structure, 100 by 165 feet. The company will abandon its Chicago factory and move to St. Louis this month.

Quarterly Output 1,000 Machines—The Crown Motor Car Co., Louisville, Ky., announces that it will turn out 1,000 machines during the next three months. The following year the Crown firm expects to make 50,000 cars. Whether the permanent plant of the company will be located in Louisville has not yet been decided.

Goodyear Cotton Mill—The latest step in the growth of the Goodyear Tire & Rubber Co. is the purchase of a large tract of ground in the heart of the cotton district known as Williamsville, Conn. On the property is a large cotton mill, four stories high and 400 feet long, where will be made a large part of the tire fabrics, hose and belting ducks so extensively used by the company. There are also on the property houses to care for 350 employees, a church, a schoolhouse, etc.

Metz Building—The Metz Co., Waltham, Mass., manufacturer of the Metz car, is building an addition to its present plant containing 90,000 square feet of floor space. Last year this company added 26,000 square feet of floor space to its plant. The present volume of business is the largest enjoyed in the history of this company, as shown by the fact that every department is being operated to its greatest producing capacity at the present time, and both day and night shifts are working.

Shows, Conventions, Etc.

October 13.....Philadelphia, Pa., National Fire Prevention Conference, Philadelphia Fire Prevention Commission.
December 9-12.....Philadelphia, Pa., Annual Convention of American Road Builders' Association.

Race Meets, Runs, Hill Climbs, Etc.

June 14.....Cincinnati, O., Hill Climb, Cincinnati Auto Dealers.
June 14-15.....San Francisco, Cal., Track Races, E. A. Moross.
June, 16, 17, 18...Columbus, O., Reliability Contest, *Ohio State Journal*,
June 19.....Chicago, Ill., Algonquin Hill Climb, Chicago Motor Club
June 21.....Cincinnati, O., Hill Climb, Cincinnati, O., Automobile Dealers.
June 21.....Philadelphia, Pa., Fletcher Cup Run, Automobile Club of Philadelphia.
June 21-22.....San Francisco, Cal., Track Races, E. A. Moross.
June 23.....Des Moines, Ia., Little Glidden Tour, Iowa Automobile Assn.
June 25-28.....Chicago, Ill., Non-Motor-Stop Reliability, Chicago to Boston, Chicago Automobile Club.
July 1.....Indianapolis, Ind., Tour of Indiana Automobile Manufacturers" Assn. to the Pacific Coast.
July 1-16.....Winnipeg, Man., Motor Plow Competition, Dr. A. W. Bell, Manager.
July 4.....Columbus, O., 200-Mile Track Race, Columbus, O., Automobile Club.
July 4.....Taylor, Tex., Track Meeting, Taylor Auto Club.
July 4.....Washington, D. C., Track Races, National Capital Motorcycle Club.
July 4-5.....Sioux City, S. Dak., Track Meetings, Sioux City Automobile Club and Speedway Assn.
July 5-6.....Tacoma, Wash., Road Race, Montemara Festa Automobile Committee.
July 8-16.....Winnipeg, Man., Midsummer Exhibition, A. C. Emmett, Manager.
July 11.....Twin City, Minn., National Reliability Tour, A. A. A.
July 20.....Seattle, Wash., Track Races, E. A. Moross.
July 27.....Grand Rapids, Mich., Tour, Grand Rapids Auto Club.
July 27-28.....Tacoma, Wash., Tacoma Road Races.
July 28-29-30.....Galveston, Tex., Beach Races, Galveston Automobile Club.
Aug. 5.....Kansas City, Mo., Sociability and Endurance Run from Kansas City to Colorado Springs, Col., Kansas State Automobile Assn.
Aug. 12.....Kansas City, Mo., Reliability Tour, Kansas State Auto Assn.
Aug. 29-30.....Elgin, Ill., Elgin Road Races, Elgin Road Race Assn.
Aug. 30-Sept. 6....Chicago, Ill., Reliability Run, Chicago Motor Club.
Sept. 1.....Columbus, O., 200-Mile Track Race, Columbus Auto Club.
Sept. 9.....Corona, Cal., Track Race, Corona Auto Assn.
Oct. 4-11.....Chicago, Ill., Around Lake Michigan Run, Chicago Motor Co.
Nov. 24.....Savannah, Ga., Vanderbilt Cup Race, Motor Cups Holding Company.
Nov. 27.....Savannah, Ga., Grand Prize Race, Automobile Club of America.

New factory of the Dyneto Electric Co., Syracuse, N. Y.

The Week in the Industry

Engineer — Dealer — Repairman — Garage

Test cars furnished by the Henderson Motor Car Co., Indianapolis, Ind., during the recent 500-mile race at Indianapolis

Road scene of the Twin City-Glacier Park Automobile Tour

On the road to the top of Royal Gorge, Canon City, Col.

HENDERSONS HELP INDIANAPOLIS GUARDS.—The above illustration shows the six cars furnished Speedway management at Indianapolis, Ind., at the recent 500-mile race, by the Henderson Motor Car Co. A soldier rode with each tester throughout the day, and after the race started the police cars were put in the infield to keep the crowds well in hand in case of accident. The many automobiles that came to the race congested all the roads to the Speedway, and the guards of the course were placed on the road early in the morning and after the race to keep the cars moving without confusion. Handling such a crowd as gathers for the annual 500-mile race at the Indianapolis Motor Speedway is no small task.

MANITOWOC GARAGE CHANGES HANDS—The garage and repair shop of S. F. Splitt at Manitowoc, Wis., has been purchased by Ullius & Bernstein, of Milwaukee.

IDEAL TRIP THROUGH ARIZONA—The Franklin Automobile Co., Syracuse, N. Y., has recently issued a twenty-page booklet on a wonderful trip made by one of its cars through the Grand Canyon of Arizona.

NATIONAL ORGANIZED IN 1900—In the May 29 issue of THE AUTOMOBILE an error was made in stating that the National Motor Vehicle Co., Indianapolis, Ind., was organized in 1904, when it should have stated in 1900.

BY WAY OF CORRECTION—In the May 29 issue of THE AUTOMOBILE a picture was captioned Massive Exhaust Manifold of De Palma's Mercedes. It should have been Mercer. In the June 5 issue a picture captioned A Snapshot of Jenkins in His Schacht, Taken Just Before the Great Contest Began, should have been, Spencer Wishart in the Mercer which Finished Second.

BUFFALO'S AMPHIBIOUS GARAGE—The Amphibious Garage Co., Buffalo, N. Y., is having plans drawn for the construction of a garage for automobiles and motor boats on the Jones property, between Ontario street and Riverside Park. This company has leased 1,200 feet of water front on the Niagara River and a portion of the uplands facing Niagara street, on which the entrance to the garage will be located.

BOSCH ESTABLISHES DISTRIBUTORS—The following stations have been appointed by the Bosch Magneto Co., New York City: S. S. Marmalee Co., Macon, Ga.; Lackawanna Automobile Co., Scranton, Pa.; Armstrong Auto Co., St. Joseph, Mo.; Electric Mfg. Co., St. Paul, Minn.; Edwards & Pickey, Portsmouth, N. H.; Susquehanna Motor Car Co., Wilkes-Barre, Pa.; J. F. Esser, Flushing, N. Y.; Spokane Cycle & Supply Co., Spokane, Wash.

MOTOMETERS ON INDIANAPOLIS RACERS—The following cars used a Motometer in the recent Indianapolis, Ind., race: De Palma, Bragg and Wishart's Mercers, the two Peugeots, three Case cars, two Masons, Clark's Tulsa, Liesaw's Anel, Pilette's Mercedes Knight, the three Isottas and the Nyberg, Keeton, Schacht and Henderson. The Motometer is manufactured by the Motometer Co., Inc., New York City, and is used as a radiator heat indicator.

CHINA'S AUTOMOBILE TRUCK ROAD—Chinese engineers, under the direction of J. G. Wong, an American-trained engineer, have been in Hongkong for some time making arrangements for commencing the survey of an automobile truck road in Kwangtung Province, which is designated as a feeder for the Kwantung section of the Canton-Hankow Railway and also probably as the beginning of a railway in connection with that truck line. The road will be about 100 miles long. It is planned to give the new road considerable hard surface dressing and to build substantial bridges, though no very important bridges will probably be needed on the enterprise planned at present. No decision has been reached as yet as to automobile or other trucks to be used, the expectancy being that the road as finished will be used for drawn vehicles for the time being. The company undertaking the enterprise is composed of Chinese capitalists who expect to begin operations in the near future.

SPARE WITH FOSS-HUGHES—R. Y. Spare, formerly sales manager of the Oldsmobile Co., Philadelphia, Pa., has joined the Foss-Hughes Co., that city.

RECEIVER FOR PHILADELPHIA FIRM—J. M. Lutz has been appointed receiver of the Automobile Service Assn., incorporated with security fixed at $5,000.

NOW IN NEW HOME—The W. B. Hollander Co., agent for the Metz car in Rhode Island, has just moved into its new salesrooms at 314 Broad street, Providence, R. I.

MAIS RESIGNS FROM STUDEBAKER—A. F. Mais has resigned as consulting engineer of the Studebaker Corp., Detroit, Mich. He will take a month's vacation before entering upon other employment.

GOING INTO NEW QUARTERS—Bunker & Reopell, now located on Fort street, Springfield, Mass., handling several lines of cars, will move into new quarters in upper State street in a few weeks.

TO FIGHT GASOLINE COST—The Missouri Engine Co., St. Louis, Mo., recently incorporated, which proposes to combat the high price of gasoline, will engage in the manufacture of coal oil engines.

NEW FORD BUILDING—Dutee Wilcox Flint, who handles the Ford line in Rhode Island, is having built a new service station and salesrooms on Allen avenue, Providence, that will be ready shortly.

ELLIOTT SECRETARY OF TRAVEL CLUB—F. H. Elliott has been elected to membership on the board of governors of the International Travel Club, New York City, and also as general secretary of the club.

CALDERWOOD LOCOMOBILE ASSISTANT MANAGER—F. A. Calderwood, assistant manager of the Lozier Motor Co. of New England, recently severed his connection with that company to accept a similar position with the Locomobile Company of America at its Boston, Mass., branch.

SEIBERLING HAYNES GENERAL MANAGER—A. G. Seiberling, for the past year factory manager of the Haynes Automobile Co., Kokomo, Ind., has succeeded C. B. Warren as general manager of the company.

SIM JOINS TIMKEN—F. N. Sim, formerly of the Burroughs Adding Machine Co., Detroit, Mich., has become assistant advertising manager of the Timken-Detroit Axle Co., and Timken Roller Bearing Co., that city.

OPENS KNIGHT TIRE AGENCY—Manager Thomas J. Harris has opened up the Knight Rubber Co., on Madison avenue, Toledo, O. His complete stock of Knight tires has arrived and the machinery and equipment for the repair department has been installed.

ASSETS AND REAL ESTATE SOLD—At a meeting of stockholders in Toledo, O., recently a portion of the real estate and assets of the Castle Lamp Co. were sold to J. N. Willys, president of the Willys-Overland Automobile Co. The Castle Co. is still in existence.

BIG ADDITION FOR GARAGE—A $30,000 addition to the Norcross-Cameron garage in Springfield, Mass., will be made in the near future. The new part of the building will be 55 by 79 feet and will be four stories in height. It is to be of brick, concrete and steel.

MOVES INTO NEW QUARTERS—The J. C. Brown Co., of Providence, R. I., doing a general accessory business at 17 Washington street, opposite City Hall, has moved into new quarters at 19 Dorrance street, which places it among the dealers in the motor center of the city.

WILLIAMS GOES TO PROVIDENCE—The Alco Co. has decided to open salesrooms for its cars and trucks at Providence, R. I., and A. G. Williams, of New York, has been sent there to take charge of the branch. It was formerly an agency there handled by Frank J. McCaw.

PARTNERSHIP DISSOLVED—George F. Howe and Wilbert L. Aller, who have been in business together for some years as the Brockton, Mass., Garage Co., have dissolved partnership, Mr. Howe going into the jewelry business while Mr. Allen will continue the motor establishment.

WINTONS AS STAGES—From Northern British Columbia to Montana, Winton sixes are being operated daily on stage runs. Operating between Ravalli and Polson in Montana are three Wintons. They cover 122 miles each day and traverse all descriptions of roads and trails, composed largely of sand and rock.

FORD'S NEW PHILADELPHIA HOUSE—The Ford Motor Co., Detroit, Mich., has purchased a plot of ground at the northwest corner of Broad street and Lehigh avenue, Philadelphia, Pa., 370 x 231 feet, on which the purchasers will build one of the largest automobile factories and salesrooms in the city. The ground is assessed at $72,000.

PENNIMAN IN CHARGE NOW—I. W. Penniman, for some time in charge of the sales department of the Walpole Tire Co.'s branch in Boston, Mass., has just been promoted to general manager of the teritory to succeed E. P. Weber, who resigned recently. Mr. Penniman was for some years manager of the Portland, Me., branch of the Goodyear Tire & Rubber Co.

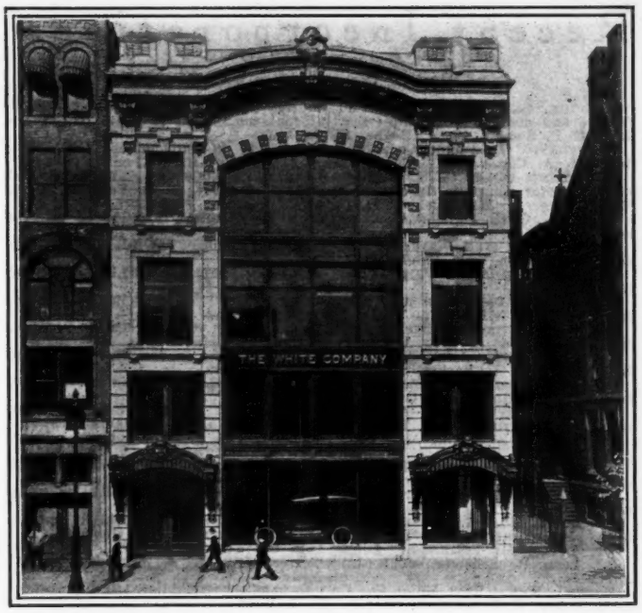
CADILLAC'S PROVIDENCE SERVICE STATION—The Cadillac Motor Car Co., Detroit, Mich., is planning a service station in Providence, R. I., which will be two stories, 65 x 95 feet, of steel beam construction and concrete foundation, brick with copper trimmings and gravel roof. An elevator, 22 x 10 feet, a sprinkler system, electric lights and steam heat will be installed.

TRADE CHANGES IN PORTLAND—A number of trade changes took place in Portland, Ore., during the past week. The Gibson Storage Battery Co. moved into its new garage at 12th and Alder streets; the Michigan Auto & Buggy Co. moved to the west side, to 514 Alder street, and E. E. Gerlinger has issued plans for a new garage which will face on Washington, Morrison and Stout streets.

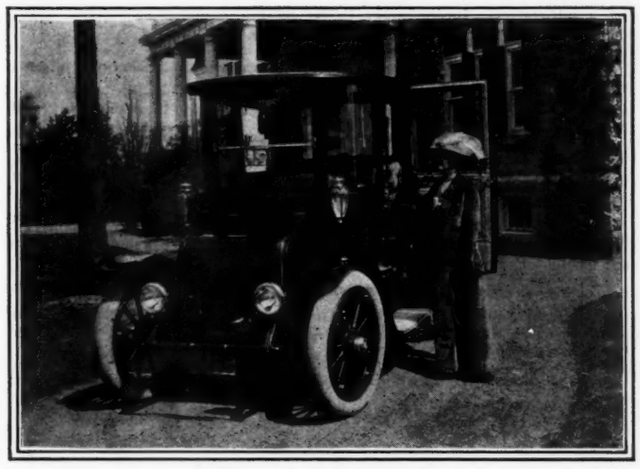
BUT FOUR AMERICAN CARS SHOWN—At a recent display of automobiles in a fair in Montevidio, Uruguay, there were but four American cars shown. Twenty-three European cars were on exhibition. The dealers in French and German cars featured price lists of their repair parts and asked prospective customers to compare them with prices of other cars. Full stocks of repair parts are carried in stock, which is another advantage claimed over American and English cars.

PACKARD'S MAY SHIPMENT LARGE—Shipments of Packard vehicles in May make the largest total for any single month in the history of the Packard Motor Car Co., Detroit, Mich. Motor carriages and trucks representing a value of $3,237,945 were delivered to purchasers. This sum, compared with the best previous record of $2,748,750 made in April of this year, shows an increase of almost half a million dollars. The total business for the two months was approximately $6,000,000.

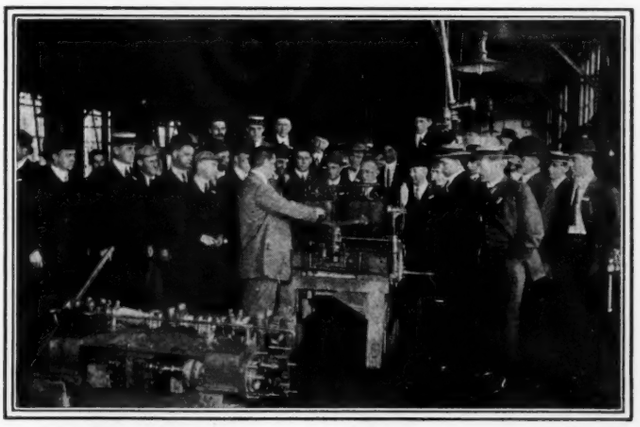
AUTOMOBILE SALESROOM LEASED—Leases have been signed by the Peerless Motor Co., Philadelphia, Pa., by the International Truck Co. and by the Garford Truck Co. for the three large automobile warehouses and salesrooms which are being built on the south side of Chestnut street, west of 23d street. The leases are all for 10 years. The building at 2304 Chestnut street, containing 40,000 square feet, has been leased to the International Truck Co.; 2310 Chestnut street has been leased to the Garford Truck Co., and 2314 Chestnut street, with 105 South 24th street, containing about 35,000 square feet, will be occupied by the Peerless Motor Co.



New salesroom and service station of the White Co., 216 North Broad St., Philadelphia, Pa., which is up-to-date in all of its facilities



Ohio electric, a product of the Ohio Electric Car Co., Toledo, Ohio, recently given by the Canadian legislators to Mrs. R. L. Borden, wife of the present Canadian Premier, as a token of their esteem for her interest in Canadian affairs



The fine points of motor assembly being demonstrated at the service convention at the factory of the American Locomotive Co. of America, in Providence, R. I., recently, where employees from all parts of the country congregated

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

BRITTON, OKLA.—Darling Automobile Mfg. Co.; capital $25,000; to manufacture and deal in automobiles and internal combustion engines. Incorporators: C. P. Stealey, W. A. Heghe, H. C. Crum.

CLEVELAND, O.—Haupt Co.; capital; to deal in automobiles. Incorporators: H. A. Couse, R. G. Curren, Mary McManus, Alfred Clum.

CLEVELAND, O.—H. & H. Auto Co.; capital, $10,000; to manufacture and deal in motor vehicles. Incorporators: F. M. Fogarty, J. O. Fordyce, A. B. Brackenridge, H. M. Riedel, G. M. Dolan.

GUTHRIE, OKLA.—Stapleton Motor Sales Co.; capital, $2,000; to deal in automobiles.

LITTLE ROCK, ARK.—Arkansas Automobile Exchange; capital, $5,000. Incorporators: Sam Yout, Estella Yout, S. J. Fechbeck.

LITTLE ROCK, ARK.—Paige-Detroit Auto Co.; capital, $101,000; to deal in automobiles.

MAYSVILLE, KY.—Brown Auto Co.; capital, $4,500; to deal in automobiles. Incorporators: Mike Brown, W. B. Tully, B. M. King.

NEW YORK CITY—A. Estelmann Co.; capital, $15,000; to deal in engines. Incorporators: H. A. Bell, August Estelmann, P. A. Warnacke.

NEW YORK CITY—Lurie Auto Co.; capital, $1,000; to deal in automobiles. Incorporators C. U. Backer, S. S. Rosen, I. R. Caplan.

NEW YORK CITY—Rich Motor Co.; capital, $2,000; to deal in automobiles. Incorporators: B. A. Rich, G. P. Harvey, De Witt Fox.

OKLAHOMA CITY, OKLA.—Auto Repair Co.; capital, $2,500; to deal in automobiles. Incorporators: F. P. Fisher, J. H. Brennan, W. M. Davis.

PIERRE, S. D.—Gerling Mfg. Co.; to manufacture gasoline engines. Incorporators: F. A. Gerling, J. P. Minick, F. S. Winslaw, John A. Holmes.

RICHMOND, VA.—Alsop Motor Co.; capital, $5,000; to manufacture and deal in automobiles. Incorporators: J. B. Alsop, C. Armentrout.

SHREVEPORT, LA.—Southern Motor Co.; capital, $10,000; to deal in automobiles.

ST. LOUIS, MO.—G. M. Automobile Co.; capital, $5,000; to deal in automobiles. Incorporators: Robert Fritschle, E. E. Schoening, H. F. Glamann.

ST. LOUIS, MO.—Grand-St. Louis Auto Co.; capital, $4,000. Incorporators: Leon B. Scherrer, John J. Scherrer, Jr., E. A. Stosberg, A. W. Michaels.

TOPEKA, KAN.—West Motor Car Co.; to handle automobiles. Incorporators: J. E. Polley, F. Langley, L. Langley, H. G. West.

WAHPETON, N. D.—Canham Automobile Co.; capital, $25,000; to deal in automobiles. Incorporator: Roland Canham.

CLEVELAND, O.—Columbian Hardware Co.; capital, $500,000; to manufacture vises, anvils, automobile forgings and a line of hardware goods. Incorporators: Julius Tuteor, H. F. Seymour, A. V. Cannon.

CLEVELAND, O.—Kouyoumajan Electric & Mfg. Co.; capital, $100,000; to manufacture a generator to supply electrical current for automobile lights and for a self-starter. Incorporator: H. K. Kouyoumajan.

COLUMBUS, O.—Babcock Garage Co.; capital, $10,000; to handle automobile supplies of all kinds. Incorporators: Alonzo G. Duer, C. Wagenhausen, L. P. Wagenhausen.

DENISON, TEX.—Davis Livery & Motor Car Co.; capital, $20,000; to maintain a garage. Incorporators: E. E. Davis, Earl Wood, R. I. Aspley.

DETROIT, MICH.—Anguish Mfg. Co.; to engage in the general metal stamping business and to manufacture automobile radiators. Incorporators: J. M. Anguish, C. H. Talbot, F. C. Arthur.

KINGSTON, PA.—Emerick Motor Bus Line; capital, $5,000; to engage in an automobile bus line.

KITTERY, ME.—Tell-Tale Auto Lamp Mfg. Co.; capital, $200,000; to manufacture automobile lamps. Incorporators: S. B. Harvey, Horace Mitchell, M. G. Mitchell.

NEW YORK CITY—Alhambra Auto Painting & Trimming Co.; capital, $1,050; to paint automobiles. Incorporators: Adolph Horenstein, Max Marcus, Herman Marcus.

NEW YORK CITY—Consolidated Auto Supply Co.; capital, $10,000 to deal in automobile supplies. Incorporators: Paul Knopf, Carl Knopf, Morton Bishop.

NEW YORK CITY—Donnelly Motor Equipment Co.; capital, $5,000; to deal in automobile accessories. Incorporators: W. J. Donnelly, Fordyce B. Caswell, R. F. Ely.

NEW YORK CITY—Keaton Patents Co.; capital, $100,000; to deal in rubber tires and pneumatic cushions. Incorporators: Geo. E. Starr, Harold A. Forbes, Chas. M. Merchant.

NEW YORK CITY—Herlihy-Scales Co.; capital, $2,500; to deal in and let sight seeing automobile companies. Incorporators: Dalton Scales, Richard Herlihy, B. A. Judd.

NORFOLK, VA.—Auto Specialty Co., inc.; capital, $25,000. Incorporators: T. Gray Coburn, F. D. Belote, I. B. Belote.

SPRINGFIELD, ILL.—Auto Owners' Protective Assn.; capital, $2,500; to form an automobile protective association. Incorporators: H. B. Williams, H. B. Conant, R. J. Eutscher.

ST. LOUIS, MO.—Missouri Engine Co.; capital, $35,000; to manufacture coal oil engines. Incorporator: A. E. Winkelmeyer.

WAHPETON, N. D.—Wahpeton Garage Co.; capital, $25,000; to maintain a garage. Incorporators: Frank Eberly, R. M. Lundey.

WICHITA, KAN.—Hockaday Auto Supply Co.; capital, $15,000. Incorporators: F. W. Martin, James Pryune, Cora Hockaday, Ray Hockaday, F. W. Hockaday.

GARAGES AND ACCESSORIES

BIRMINGHAM, ALA.—Turner Bros.; to do a jobbing business in automobile accessories. Incorporators: Oscar C. Turner, John D. Turner, Wm. M. Bowles, J. G. Fitzsimons.

BLOOMINGTON, ILL.—People's Taxicab Co.; capital, $2,000; to maintain and operate a taxicab garage. Incorporators: J. A. Beck, Chester Montgomery, R. A. Jolly.

BROOKLYN, N. Y.—Auto-Transit Co.; capital, $100,000; to maintain automobile and truck livery. Incorporators: J. J. Lilly, J. M. Battle, C. J. Leslie.

BROOKLYN, N. Y.—R-M Auto Repair Co.; capital, $15,000; to repair automobiles. Incorporators: R. D. Marx, W. L. Marx, G. P. Marx.

BUFFALO, N. Y.—Amphibious Garage Co.; capital, $25,000; to maintain a garage. Incorporators: G. F. Staples, T. H. Noonan, H. L. Hommedieu.

CHICAGO, ILL.—Auto Control Co.; capital, $200; to deal in automobile supplies: Incorporators: Lee Hammond, J. B. Lund, A. F. Johnson.

CHICAGO, ILL.—Bartola Keyboard Sales Co.; capital, $50,000; automobile livery. Incorporators: M. M. Franey, A. J. Goldfine, H. P. Munns.

CHICAGO, ILL.—Electric Maintenance Co.; capital, $50,000; to manufacture automobile accessories and deal in supplies. Incorporators: W. B. Christie, C. E. Winters, W. A. Baehr.

CHICAGO, ILL.—Ferns Motor Livery; capital, $50,000; automobile livery. Incorporators: M. M. Franey, A. J. Goldfine, H. P. Munns.

CHICAGO, ILL.—Marshfield Garage; capital, $1,200; to maintain automobile garage. Incorporators: Charles Keller, Henry Hantover, Maurice Klein.

CHICAGO, ILL.—Modern Auto Starter Co.; capital, $10,000; to manufacture automobile accessories. Incorporators: M. I. Rosenbaum, M. Richardson, Maurice Altschuler.

CHICAGO, ILL.—Modern Garage & Motor Livery Co.; capital, $2,500; to maintain an automobile livery and garage. Incorporators: P. P. Harris, R. W. Warner, John Pfeiffer.

CINCINNATI, O.—K. Auto Delivery Co.; capital, $10,000; to do automobile trucking. Incorporators: Edward Konker, Geo. W. Bell, Anna Konker, Gus Konker, Fred Schmidt.

CHANGES OF NAME AND CAPITAL

AKRON, O.—B. F. Goodrich Co.; capital decreased from $200,000 to $10,000.

CHICAGO, ILL.—Krickworth Motor Wagon Co.; change of name to Mahaska Hotel Co.

CINCINNATI, O.—Queen City Delivery Co.; capital, $50,000.

CLEVELAND, O.—City Auto Tire & Repair Co.; change of name to City Auto Tire & Supply Co.

DES MOINES, IA.—Riddell Automobile Co.; change of name to Clemens Automobile Co.

FORT WORTH, TEX.—Allen-Vernon Motor Car Co.; change of name to Harrison-Vernon Motor Car Co.

FOSTORIA, O.—Allen Motor Co.; capital, increased to $500,000.

GILL LAKE, SASK.—Burgess Patent Tire Co. of Canada; capital, $600,000.

PADUCAH, TEX.—Mayer, Street & Alexander; change of name to Street-Whittington Co.

ROSSLYN, VA.—District Automobile Service Co.; change of name to G. R. Cowie Co.

SYRACUSE, N. Y.—Syracuse Auto Radiator Co.; capital, $50,000; to manufacture and deal in auto radiators. Incorporators: M. Kaman, T. Vickers.

New Agencies Established During the Week

PASSENGER VEHICLES

Place	Car	Agent
Albany, N. Y.	Chandler	C. S. Ransom
Altoona, Pa.	Chandler	Chas. R. Fiuke
Baltimore, Md.	Chandler	Cole Motor Sales Co.
Boston, Mass.	Chandler	Chandler Motor Car Co. of New England
Boston, Mass.	Paige-Detroit	Chandler Motor Car Co.
Bridgeport, Conn.	Chandler	J. N. Bulkley
Brooklyn, N. Y.	Chandler	Tanner Motor Car Co.
Cedar Rapids, Iowa	Chandler	Iowa Motor Sales Co.
Chicago, Ill.	Chandler	J. L. Russell
Cleveland, O.	Chandler	Lozier Sales Co.
Cleveland, O.	Ohio	Haupt Co.
Creighton, Neb.	Auburn	Hofer Bros.
De Smet, S. D.	Cole	De Smet Auto Co.
Des Moines, Iowa	Chandler	Jenkins & Co.
Detroit, Mich.	Chandler	Grant Bros.
Detroit, Mich.	King	Bleil, O'Donnell & Richardson
East St. Louis, Ill.	Chevrolet	H. Harper
Edmonton, Alta, Can.	Cole	Sellick Bros.
Erie, Pa.	Chandler	Stirling Bros. Co.
Farmington, Mo.	Cole	Ed. Klein
Fort Worth, Tex.	King	Overstreet-Loveless Automobile Co.
Freeheold, N. J.	Cole	Clayton & Donahay
Grand Rapids, Mich.	Cartercar	L. Phelps
Grand Rapids, Mich.	King	L. Phelps
Grand Rapids, Minn.	Cole	Leon M. Bolter
Hannibal, Mo.	Overland	Chas. Mueller
Hastings, Neb.	Cole	E. A. Brandes
Huron, S. D.	Cole	A. M. Urquhart
Hutchinson, Kans.	Rambler	Eaton Auto Co.
Indianapolis, Ind.	Chandler	Brant Bros.
Jersey City, N. J.	Chandler	Burke Bros. Co.
Kansas City, Kan.	R-C-H	A. Garnier
Little Rock, Ark.	Franklin	Jones & Lewis
Little Rock, Ark.	Paige-Detroit	Paige-Detroit Auto Co.
Los Angeles, Cal.	Chandler	Sparks-Miller Auto Co.
Louisville, Ky.	Mercer	Hougland Bros. Co.
Madison, S. D.	Cole	Abel Mitchell
Matador, Tex.	Franklin	Jack Luckett
Mattapan, Mass.	R-C-H	Mattapan Motor Car Co.
Memphis, Tenn.	Chandler	Blomberg Auto Co.
Milwaukee, Wis.	Chandler	Archambault Motor Sales Co.
Mitchell, S. D.	Cole	H. J. Hooper
Morris, Ill.	Franklin	D. F. Huff
Nashville, Tenn.	Regal	East Nashville Auto Co.
Newark, N. J.	Chandler	Whiting Motor Co.
New Bedford, Mass.	Cadillac	Robertson Motor Co.
New Haven, Conn.	Chandler	Holcomb Co.
New York City	Chandler	Brady-Murray Motors Corp.
Omaha, Neb.	Chandler	W. L. Huffman
Pawnee, Neb.	Empire	W. C. Fellers
Petaluma, Cal.	Cole	S. L. Canevascini
Philadelphia, Pa.	Chandler	Chandler Motor Car Co. of Philadelphia
Pierre, S. D.	Cole	Gas Belt Auto Co.
Pittsburgh, Pa.	Imperial	Klingler Co.
Pittsfield, Mass.	Michigan	Louis Larouche
Plainfield, N. J.	Cole	Laing Machine Auto Repair Co.
Poughkeepsie, N. Y.	Chandler	John Van Benschoten
Providence, R. I.	Alco	American Locomotive Co.
Rapid City, S. D.	Midland	Thomas Roush
Raton, N. M.	Cole	E. J. Love Motor Co.
Rochester, N. Y.	Chandler	Strong Crittenden Co.
Round Lake, Minn.	Cole	Thomsen Bros.
San Francisco, Cal.	Chandler	S. G. Chapman
San Francisco, Cal.	Crawford	E. Stewart Automobile Co.
San Francisco, Cal.	Jackson	Wichita Motor Truck Co.
Scranton, Pa.	Chandler	Conrad-Chandler Motor Car Co.
Seattle, Wash.	Chandler	Clayton Gibson
Sioux Falls, S. D.	Cole	Ellingson Bros.
Spokane, Wash.	Franklin	Franklin Motor Car Co.
Springfield, Mass.	Chandler	R. A. McKee
Springfield, Mass.	Little	Bunker & Reopell
St. Joseph, Mo.	Chandler	E. C. Eads
St. Louis, Mo.	Allen	Mound City Buggy Co.
St. Louis, Mo.	Chandler	Overland Auto Co.
Topeka, Kan.	Herreshoff	Herreshoff Motor Co.
Tucson, Ariz.	Cartercar	Cartercar Arizona Co.
Uniontown, Pa.	Chandler	Standard Automobile Garage
Uniontown, Pa.	Locomobile	George Gans
Vancouver, B. C.	Chandler	Hoffmeister Bros.
Washington, D. C.	Chandler	Miller Co.
Waterloo, Ia.	Chandler	Central Auto & Supply Co.
Waterloo, Ia.	Moline	Iowa Auto Co.
Wilmington, Del.	Chandler	Wilmington Automobile Co.

Export Field for American Cars Grows

THE calendar year 1912 has brought out several surprises in the manufacturing world, especially in the automobile field. In former years the American car was a very small factor in the trade of foreign countries, but with the advent of the cheap car costing around $1,000, the United States has forged to the front and now ranks with the other nations in this field. Our manufacturers are establishing stations in South America and other parts of the world where the owners there will be convenienced with ready parts and service.

Low-priced Automobiles—An American consular officer reports that a firm in his district desires to be placed in communication with American automobile manufacturers, with the intention of importing cars which cost $1,000 or less delivered, duty paid. This firm desires prices c.i.f., city of destination, and states its willingness to undertake the agency or representation of a firm manufacturing a low-priced automobile, being of the opinion that there is a good opportunity for the sale of same if properly introduced. Catalogues, discounts, prices, conditions, etc., are requested. Clear understanding as to granting or representation as agent is also requested by the firm. Correspondence should be in Italian, French or Spanish. Inquiries at the Bureau of Foreign and Domestic Commerce, Washington, D. C. File No. 10851.

Heavy Oil Motors—A report from American consul in a European country states that a local business man desires to communicate with American manufacturers of heavy oil motors. Quotation, etc., should be addressed direct to the inquirer. File No. 10901.

Automobile and Agency—The secretary of an automobile club in a European capital informs an American consular officer that he wishes to buy an automobile for his own use from some company he might represent as agent. The price of the automobile should not exceed $1,300, and the car must be a good hill climber. Correspondence may be in English. File No. 10930.

Electric-motor Ambulances—An American consul reports that the medical officer of a local municipality has left for London on leave of absence, and he has been instructed by the council to examine the different makes of eleetric-motor ambulances with a view to the purchase of two such vehicles for local use. One of the ambulances is intended for ordinary use and the other is for handling infectious-disease cases. American dealers in electric vehicles who may be interested should send catalogues, price lists, etc., to the London address of this officer, or have their representative call on him. All correspondence regarding the ambulances should be in English. File No. 10984.

Electric-motor Trucks—A foreign municipal engineer is now testing an American electric-motor truck imported by a local firm, in handling city refuse. An American consul reports that the test will last about a month, and if it proves successful the engineer will recommend the purchase of half a dozen trucks of different makes to compare the efficiency of each, after which it is possible that about twenty-five of the make decided upon as the best for the local needs will be purchased. American manufacturers of electric-motor trucks who care to compete in supplying these trucks should send descriptive catalogues to the engineer at the earliest opportunity, and should quote him their lowest possible prices. Correspondence should be in English. File No. 10987.

Motor Cars—A report from an American consul states that a large shipping and agency firm, with branches in several cities, desires to get into touch with American manufacturers of low-priced American motor cars with a view to becoming the agents for such firms. All correspondence on the subject should be in English and should be addressed to the head of the firm whose name is furnished. File No. 10934.

Motor Agency.—An importer and general merchant in an African city informs an American consular officer that he desires to negotiate with manufacturers of motors for the exclusive agency for a certain territory. He is especially interested in the Porto motor, which is said to be an American engine, and he believes that on account of its small dimensions he can handle it successfully on the local market. It is requested that duplicated catalogues, etc., be sent to the consular officer for reference in case the inquirer does not take up the agency. File No. 10937.

Motor Fire Engine—The American consul at Leeds, England, reports that the town council of Pudsey, Yorkshire, England, has appointed a committee to investigate conditions of fire protection. A motor fire engine is among the equipment the committee expects to procure. Correspondence should be addressed to the town clerk, Pudsey, Yorkshire, England, for use of the special committee referred to. File No. 10974.

Gas Motors and Automobiles—A report from an American consular officer in the near East states that a member of a very prominent family in his district, and one of the leaders in the country, desires an agency for gas motors, 2 to 6 horsepower, motor, 16 to 45 horsepower, and an 8-horsepower four-seat automobile specially adapted to hill climbing and one 8-horsepower gas motor for an oil press. Prices should be quoted c.i.f., city of destination, delivery not later than August. File No. 10708.

German Automobile Developments—German automobile manufacturers report that 1912 was an entirely favorable year for them. It brought an expansion surpassing even in percentage that of 1911. According to official provisional statistics now available, the foreign trade grew from $14,268,000 to $21,347,000 in the course of the year, and reports of the home trade, although not yet in statistical form, indicate as favorable a situation. The greater part of the growth in foreign trade is accounted for by increased exportation, especially of passenger automobiles. In 1911 Germany exported 5,154 vehicles of this type, worth $10,099,000, in 1912, 7,948, worth $15,473,000. Motor trucks were exported in 1912 to the number of 694, valued at $1,849,000, as compared with 346 in 1911, valued at $980,000. Germany's imports of automobiles did not increase in the same proportion as her exports. In value they grew from $2,792,000 in 1911 to $3,432,000 in 1912, an increase of only 22 per cent., as compared with 56 per cent. in the case of exports. In number the increase was from 1,823 to 2,267. Germany's importation of motor trucks increased from 134 to 201 in number and from $390,000 to $607,000 in value. The aggregate value of the vehicles produced in 1911, including extra parts and the value of repair work done during the year, is given at $37,300,000, as compared with $26,000,000 in 1910 and $17,300,000 in 1909. The aggregate value of the products of auxiliary and dependent industries in 1911 is estimated at $48,500,000.

American Trade with London—The total import value from London to the United States during 1911 and 1912 was $458,829 and $392,054 respectively. Special attention is called to the importing of American cars into London, from the United States, in 1911 of the aggregate value of $2,253,321, while in 1912 the value rose to $2,867,993. The average price of the American automobile imported in 1912 was $972, as against $762 in the preceding year, showing a growing demand for the higher-priced automobile of American manufacture.

Italy Sells 3,587 Automobiles—Automobiles sold abroad by Italy last year numbered 3,587, having an average value of nearly $2,000. Exports in 1911 and 1910 numbered 2,918 and 2,120, respectively.

Birmingham's Exports to U. S.—The declared exports from the Birmingham district to the United States and possessions, in 1911 and 1912 were $131,642 and $160,075 respectively.

American Trade in Rangoon—During 1912, forty-one automobiles, valued at $32,246, were imported from the United States, as compared with fifteen cars, valued at $12,063, in 1911. During 1912, 120 automobiles were registered in Burma, of which forty-eight were American.

American Trade in Switzerland—The invasion of Europe by the American-made automobile, which until a few years ago was denounced by the continental manufacturers as cheap and worthless, continues. The demand for American cars in the Swiss market is confined generally to those of medium or low price, as the European manufacturers have given little attention to the production of that class of machines. The American automobile has taken its place beside the best makes of other countries, its efficiency and durability having been demonstrated by the severest competitive tests of speed and endurance. About fifty American automobiles were sold in Switzerland within the past year, and agencies have been established in several places in the Confederation for the exclusive sale of the medium-priced motors of American make.

Accessories for the Automobilist

THE **Crouse Starter**—The Crouse Air Crank, made by the Auto Air Appliance Co., Annapolis, Md., is constructed on the compressed air principle and utilizes a rack-and-pinion mechanism for cranking the motor. It consists of a cylindrical casing C, Fig 3, part of which is formed as an air motor cylinder in which a piston P, packed against the wall, is reciprocable, although ordinarily it is pressed against one cylinder end by a spring S. If air is admitted from that end through a pipe A, the piston is moved against the spring pressure and presses the connecting rod Q outwardly. Q is linked to the rack R meshing with a pinion C mounted at the front of the crankshaft. Consequently, the movement of the piston cranks the motor. The rack is in engagement with the pinion only when air enters through A. as then not only piston P is actuated, but some of it passes through the passageway O bored in Q into two small cylinders D containing springs T. The later press against pistons to which the rack is connected, thereby forcing the latter away from the pinion. When the end of the stroke of P is reached, the admission of air ceases automatically, the springs T retract the rack and S returns the P, Q and R to their original position, ready to be moved again if the motor has failed to start.

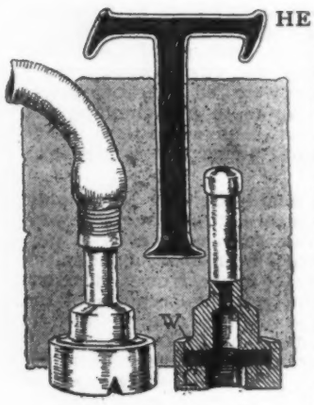


Fig. 1—Carrs B & G connection

Johns-Manville Extinguisher—The H. W. Johns-Manville Co., New York City, manufactures a new fire extinguisher which comes in bombs, being composed of a compressed, incombustible gas which is five times heavier than air. One quart of this gas if released develops 4,000 cubic feet of gas at atmospheric pressure, being sufficient to quench any fire at the time of starting. The gas is dry, and as it contains no moisture, it produces no rust nor corrodes metal parts if applied to them. Likewise, it does not injure the skin, fabrics, etc.

Tribune Double Headlights—A novel and exclusive feature of the new Tribune Thirty-Six is a double electric headlight, Fig. 2, combining the functions of sidelight and headlight by means of two bulbs in each. The larger bulb, of 16 candlepower, is located conventionally in the apex of the reflector, while the smaller bulb, of 6 candlepower, is just beneath. It is claimed for this arrangement that greater efficiency is obtained, especially for the smaller lights. The current for the lights is supplied from a storage battery, charged by a lighting generator.

Weed-Chain Plier—The Currier-Koeth Mfg. Co., Coudersport, Pa., make, among other automobile tools, a plier for the adjustment of Weed chain links. The pliers are made of steel and the jaws are so formed as to easily open the link to just the right distance. The tool may be operated with one hand.

Carrs Special Tire Hose Connection.—C. Carrs, of 1777 Broadway, New York City, has begun the manufacture of special connections for tire inflation hose, Fig. 1. This connection, as it is called, simply consists of a specially formed lock which fits in place of the ordinary lock of Acorn and Eclair connections used to produce a sliding joint between the inflation hose and the valve stem. In the case of Acorn and Eclair connections, a rubber washer is in place between the cup and the cap, and the end of the hose, fitted with a metal piece, is shoved into the rubber washer, which keeps the air from escaping. However, when the tire is pumped up to a pressure considerably below that demanded by the maker, the hose frequently blows off, especially when the rubber washer has been used for some time. In order to prevent this in the case of the B & G connection, Fig. 1, the same which forms a cap is threaded to fit over the cup of the ordinary connections replacing the common caps, and the inner surface of the cap is threaded along a thin longitudinal zone, so as to be capable of engagement with the thread formed on the tire valve casing. The latter, as is well known, has two flat surfaces, where the thread is cut away. In puting the connection on the tire valve, the end of the valve casing is pushed into the opening of the cap C, in such a position that the threaded portion of the cap, marked outside by a cut-away in the metal, comes over the unthreaded portion of the valve casing. When the end of the latter has been driven into the rubber washer, the connection is turned, and the narrow thread in the cap engages that on the valve casing, thereby locking cap and casing against relative longitudinal displacement, movement along screw lines given by the casing thread being the only possi-

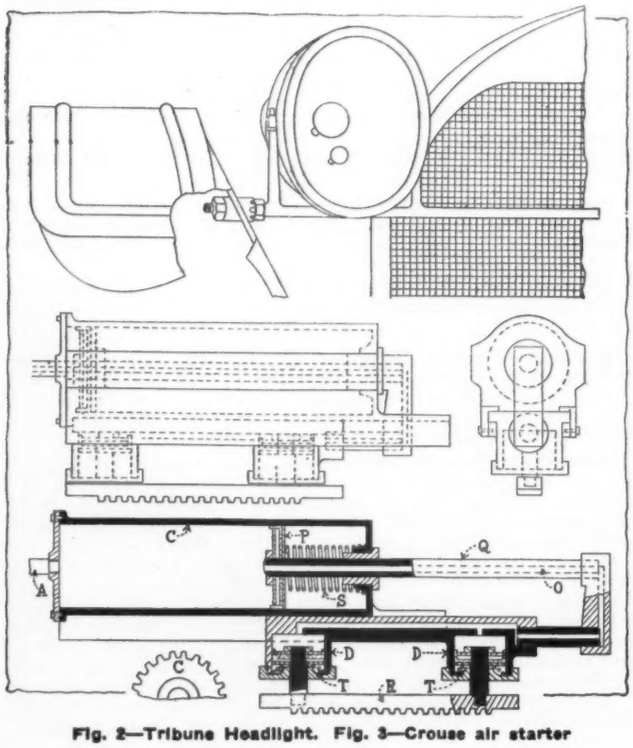


Fig. 2—Tribune Headlight. Fig. 3—Crouse air starter

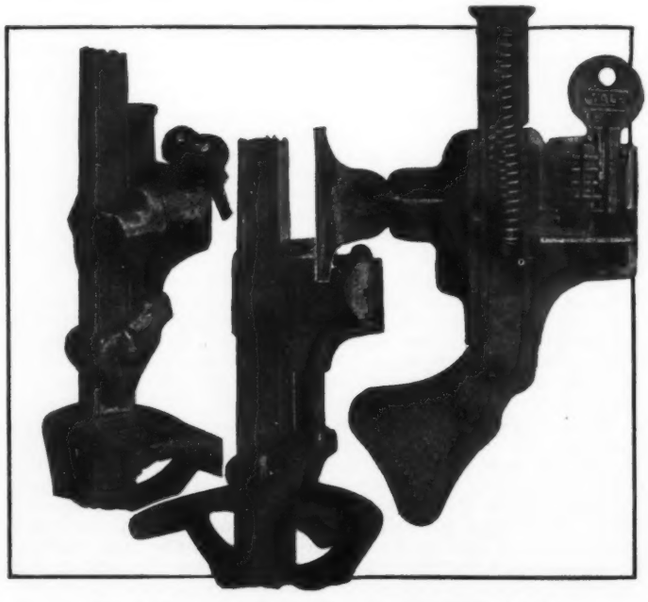


Fig. 4—Bryant service lock to prevent theft of car

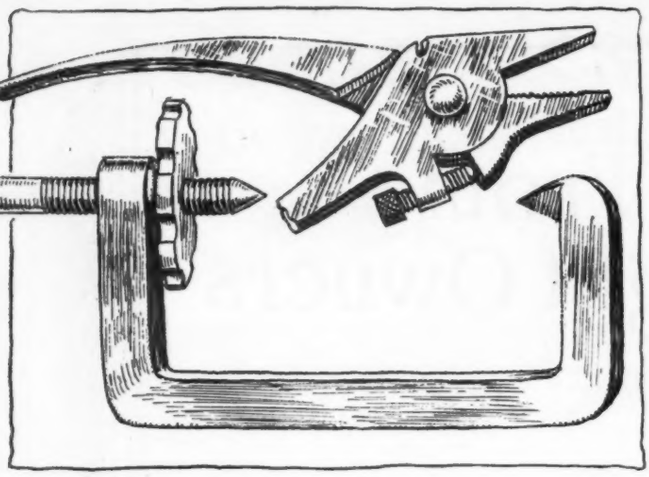


Fig. 6—Westhaven plier. Fig. 7—Townsan spring spreader

ble. Now, of course, the reaction of the air entering through the valve is not strong enough to displace the connection, and, whether the washer is new or old, the connection cannot blow off.

Dean Electric Fordorn—The Dean Auto Devices Co., Chicago, is the maker of the Fordorn automobile signal, which is electrically operated, using the excess current generated by the powerful magneto of the Ford car. The horn consists of a brass trumpet, which is attached to a black-enameled frame. The latter is fastened by screws to a heavy steel ring supporting the motor magneto and the armature which is vibrated by the motor-driven ratchet. The motor magnet is composed of thin iron plates varnished to insulate them of one another. A diagram showing how the horn is to be connected with the ignition circuit is furnished with the device, and control is by means of a button, which is preferably mounted on the steering wheel of the car.

Townsan Leaf Spring Spreader—In Fig. 7 the Townsan spring spreader, made by the Townsan Auto Specialty Co., Mitchell, S. D., is illustrated. It consists of a steel bar shaped as a channel to embrace the spring across its width. A steel wedge is secured to one end of the channel, while the other is formed with a threaded hole through which screws a bolt carrying a conical steel point at its end. By placing the wedge between two leaves on one side of the spring and the point on the other side, and by then working the screw carrying the latter, the two leaves are spread apart and a possibility is afforded to put lubricant between them.

Bryant Service Lock—Fig. 4 shows the Bryant automobile lock which consists of a vertical bar formed as a rack and secured to the gearshift lever so as to not be removable therefrom, and a part slidable upon the same but ordinarily engaging the rack. Engagement and disengagement of the slidable part and the rack are controlled by a Yale lock; so that, unless the tumblers are turned by means of the individual Yale key, the relative position of rack and part cannot be changed. The slidable part carries at its lower end a fork taking up the space between the gearshift lever and the quadrant if the part is lowered when the gears are in neutral. Attachment of the device to the lever is so that it cannot be taken off the same.

Westhaven Patent Plier Wrench—The West Haven Mfg. Co., New Haven, Conn., is the maker of the plier wrench, Fig. 6, which is constructed with an adjustable jaw movable by means of a setscrew. In using the plier as a wrench, the setscrew takes the strain which otherwise would be transmitted by the jaw to the pivot, in other words, half of the working strain. The jaw, which is operated by the setscrew, is formed with serrations along its gripping face, and the plier is therefore made available to act as a wrench in grasping round objects. The second jaw is formed with a slot across which cuts the knife edge of the lever supporting the first jaw, thus making it possible to use the tool as a wire cutter.

Herz Tape Grip Rings—Herz & Co., New York City, have brought out a new device for coupling rubber tubing on to metal pipes, especially for water conduits around the engine. The device, Fig. 8, consists of a metal ring formed along the inside of one edge with an inward rim. A slot is cut through the ring, and the operation is as follows: To obtain a tight connection between rubber hose and the pipe, the end of the hose is slipped over the latter and the ring is then put on top over both. It now remains to take up the slack between the two and to do this white tape or black tailor's tape is slipped through the slot in the ring; then the latter is begun to be turned. As it turns, the friction between the rubber and the tape keeps the latter in close adhesion to the former, and as a result tape is wound up around the rubber hose and inside the ring. The more tape is thus used, the tighter becomes the joint. If enough tape is used, the joint becomes not only waterproof, but gastight as well.

Gurney Solid Ball Retainer—The Gurney Ball Bearing Co., of Jamestown, N. Y., has designed the new retainer, Fig. 5, which is now being used in its ball bearings. The retainer is made of a single piece of anti-friction metal shaped as a ring and formed with a number of cavities for holding the balls of the bearing. These cavities are so dimensioned as to easily accommodate the balls, yet at the same time avoid all lost motion. Thus, they are permitted to rotate freely in the retainer, and due to the composition of the latter—from anti-friction metal—there is very little resistance to the free movement of the balls; incidentally, the chemical constituency of the metal which makes it frictionless, also prevents the generation of noise between balls and retainer, so that the bearing is very quiet. The remainder of the Gurney bearing, not shown here, are chrome steel rings and balls, which are maximum with respect of the circumference.

Woodworth Inner Tire Sleeve—A new inner sleeve or liner, Fig. 9, is being made by the Woodworth Tire Good Co., Niagara Falls, N. Y. It is made of heavy chrome leather and is lined with five buttons and holes into which these fit, a flap overlapping the button line so as to reinforce the inner circumference of the inner tube. If it is desired to apply the liner for the purpose of reinforcing the tube in a weak place, the tube is removed from out the shoe and after being inflated to the correct degree is surrounded by the liner, after which it is replaced in the casing. Each sleeve is made with two rows of buttonholes, making it usable for two tire sizes.

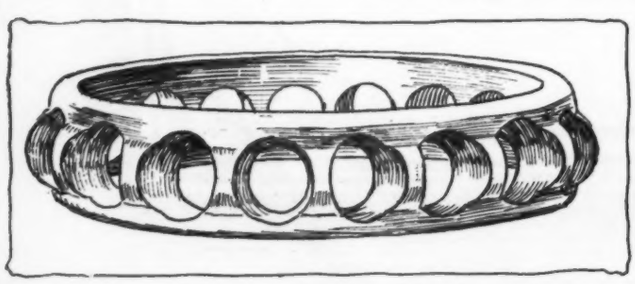


Fig. 5—Gurney anti-friction ball bearing retainer

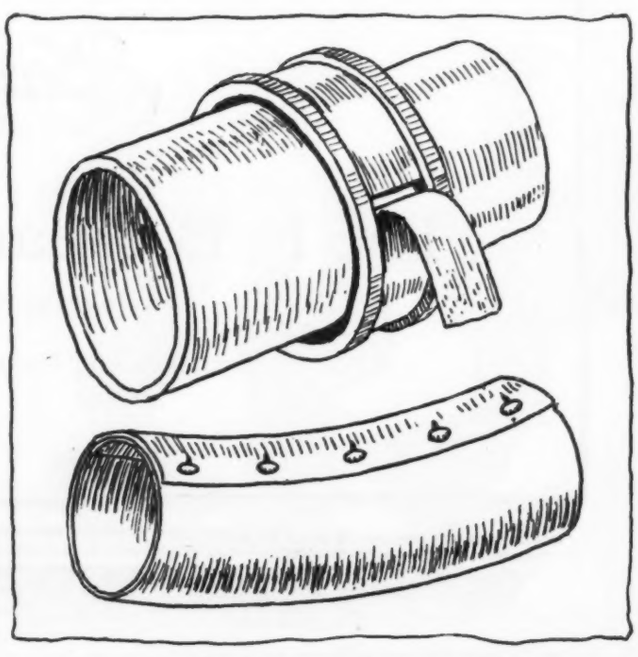


Fig. 8—Herz tape grip ring. Fig. 9—Woodworth sleeve